

# SST Switch™ 3D Gun

3A8476E

EN

*Swiveling applicator for robotic sealing applications. For professional use only.*

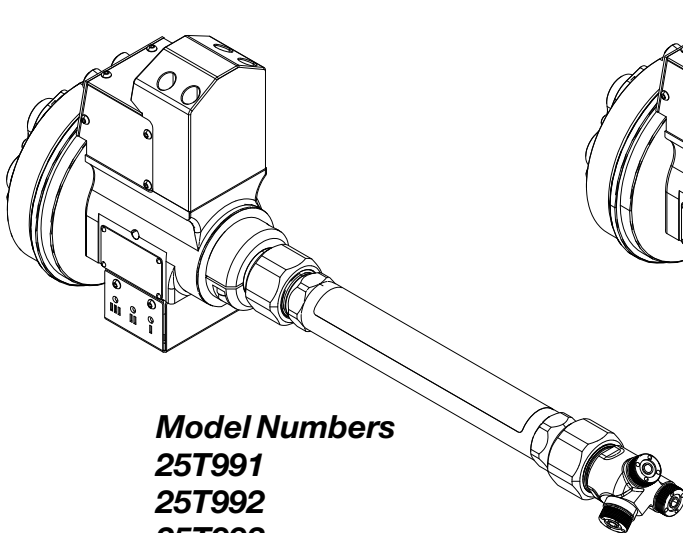
**Not approved for use in European explosive atmosphere locations.**

See page 3 for model information including maximum working pressure.



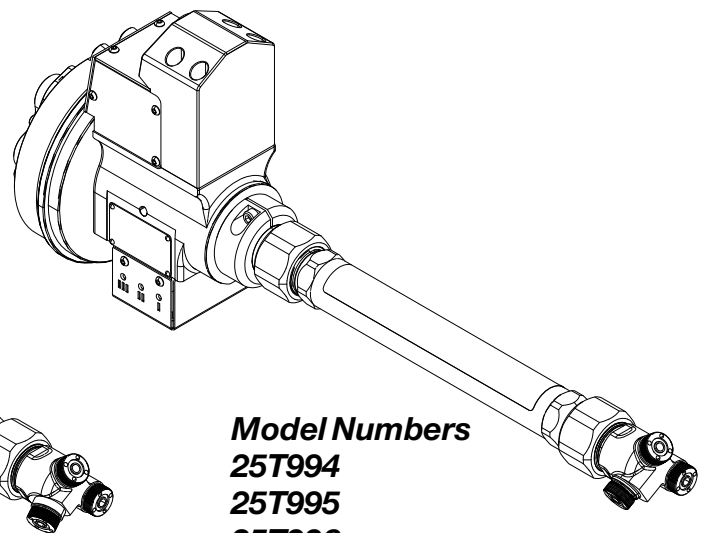
## Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment.  
Save these instructions.



### Model Numbers

25T991  
25T992  
25T993



### Model Numbers

25T994  
25T995  
25T996



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## Related Manuals




Manual in English	Description
3A8066	Switch 3D Gun Mounting Kit

## Models

Part No.	Series	Maximum Working Pressure psi (MPa, bar)	Material Port Options	Sensor Types	Cable Type	Nozzle Configuration in degrees
25T991	B	3350 (23.1,231)	One Port One Material No Recirculation	No Sensors	5 Pin	0, 45, 75
25T992	B		One Port One Material No Recirculation	Temperature	5 Pin and 8 Pin	
25T993	B		One Port One Material No Recirculation	Temperature and Pressure	5 Pin and 8 Pin	
25T994	B		One Port One Material No Recirculation	No Sensors	5 Pin	0, 45, 90
25T995	B		One Port One Material No Recirculation	Temperature	5 Pin and 8 Pin	
25T996	B		One Port One Material No Recirculation	Temperature and Pressure	5 Pin and 8 Pin	

# Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 <h1 style="margin: 0;">WARNING</h1>	
	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not point dispensing device at anyone or at any part of the body.</li> <li>• Do not put your hand over the fluid outlet.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Follow the <b>Pressure Relief Procedure</b> when you stop dispensing and before cleaning, checking, or servicing equipment.</li> <li>• Tighten all fluid connections before operating the equipment.</li> <li>• Check hoses and couplings daily. Replace worn or damaged parts immediately.</li> </ul>
	<p><b>EQUIPMENT MISUSE HAZARD</b></p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Specifications</b> in all equipment manuals.</li> <li>• Use fluids and solvents that are compatible with equipment wetted parts. See <b>Technical Specifications</b> in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request Safety Data Sheets (SDSs) from distributor or retailer.</li> <li>• Turn off all equipment and follow the <b>Pressure Relief Procedure</b> when equipment is not in use.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>• Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.</li> <li>• Make sure all equipment is rated and approved for the environment in which you are using it.</li> <li>• Use equipment only for its intended purpose. Call your distributor for information.</li> <li>• Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>• Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>• Keep children and animals away from work area.</li> <li>• Comply with all applicable safety regulations.</li> </ul>



# WARNING



**BURN HAZARD**

Equipment surfaces and fluid that is heated can become very hot during operation. To avoid severe burns:

- Do not touch hot fluid or equipment.



**PERSONAL PROTECTIVE EQUIPMENT**

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. Protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

# Overview

## Description

The SST Switch 3D Gun is a Stainless Steel, high-pressure, multi-nozzle material applicator for robotic applications that require high precision and quality. The SST Switch 3D Gun is equipped with a swivel for optimum robot flexibility and has three individually operated nozzles. The swivel makes it possible for the robot to rotate the nozzle head independently of the cables and the hoses supplying the SST Switch 3D Gun.

The nozzle head can be specified for various nozzle types, angles and slot directions.

Due to its flexibility, the SST Switch 3D Gun is designed for applications like:

- Liquid Applied Sound Dampner (LASD).
- Underbody coating (UBC).
- Underbody sealing (UBS).
- Seam sealing, ISS, HEM.

The SST Switch 3D Gun is designed to handle most types of single component adhesives and sealants with medium to high viscosity.

The solenoid valves operating the pistons for the material valves are mounted externally for easy maintenance.

If required, the following optional features can be added to the basic configuration of the SST Switch 3D Gun:

- One PT 100 temperature sensor in the material inlet, measuring the inlet material temperature.
- The material pressure can be monitored by a pressure transducer mounted in the material channel.

# Component Identification

## Main Assembly

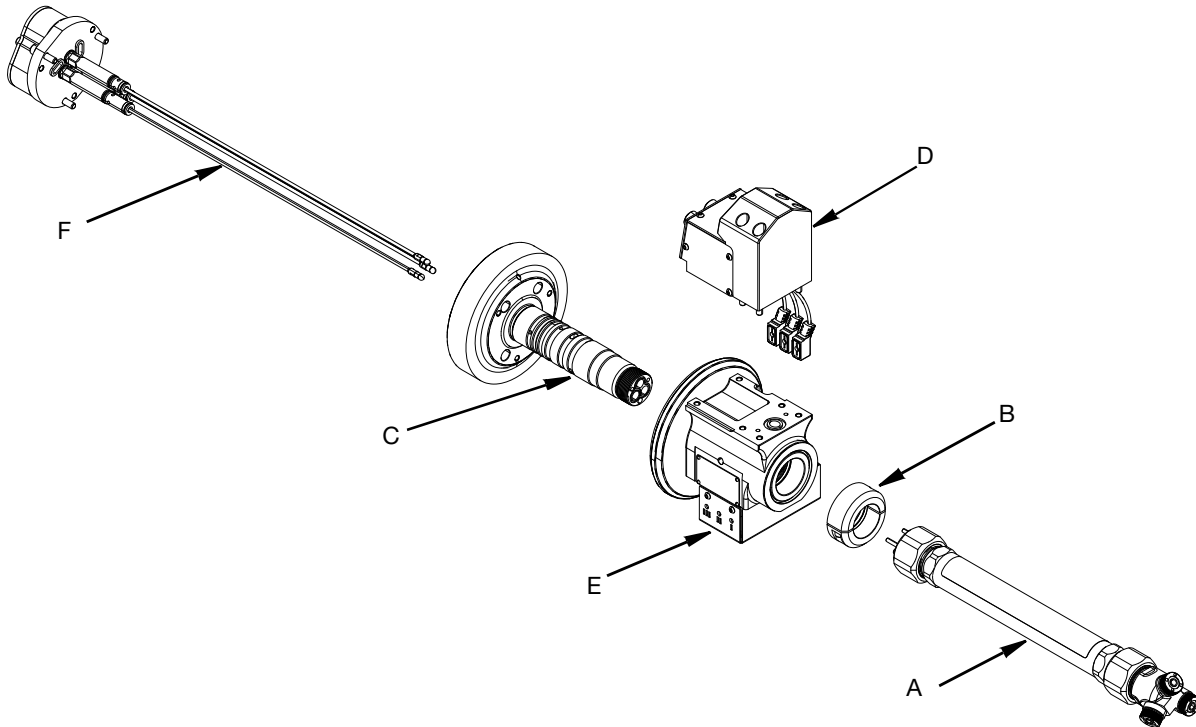


FIG. 1

**Key:**

- A. **Nozzle Head and Material Tube Assembly** page No. 28
- B. **Lock Ring Assembly** page No. 29
- C. **Central 3D Body** page No. 29
- D. **Connection Housing** page No. 32
- E. **Swivel Chamber** page No. 31
- F. **Modular Air Cylinder Assembly 25U924** page No. 30

# Installation



To avoid personal injury, be especially careful when connecting the high pressure material supply system and always keep clear of the nozzles when test spraying.

Before starting installation of the Graco SST Switch 3D Gun, refer to the **Description** on page 6, and **Component Identification** on page 7, in order to be familiar with the various parts of the SST Switch 3D Gun.

To ensure trouble free operation of the SST Switch 3D Gun, it is important that the unit is properly installed on the robot. It is important that the function of the SST Switch 3D Gun is carefully checked before start up.

The SST Switch 3D Gun has multiple robot mounting options which can be purchased separately from Graco. See SST Switch 3D Gun Mounting Kits Manual, (3A8066) for instructions and parts for mounting to a specific robot. For typical installation of a SST Switch 3D Gun see **SST Switch 3D Gun Installation** in this section.

Inspect the SST Switch 3D Gun for shipping damage. If there is damage notify the shipping carrier immediately.

## Grounding



The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.

The following grounding instructions are minimum requirements for a basic SST Switch 3D gun installation. The specific system and robot being used may include other equipment or objects that must be grounded. Check local codes for detailed grounding instructions.

**SST Switch 3D Gun:** Ground through a connection to a properly grounded material hose and pump.

**Pump:** See your pump manual.

**Material hoses:** Use only electrically conductive hoses with a maximum of 100 ft. (30.5 m) combined hose length to ensure grounding continuity. Check the electrical resistance of the material hoses at least once a week. If the total resistance to ground exceeds 25 megohms, replace the hose immediately. Use a meter that is capable of measuring resistance at this level.

**Fluid supply container:** Follow local codes.

**Solvent pails used when flushing:** Follow local codes. Use only conductive metal pails, placed on a grounded surface. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts grounding continuity.

**To maintain grounding continuity when flushing or relieving pressure:** hold metal part of the SST Switch 3D Gun firmly to the inside of a grounded metal pail, then trigger the valves.

## SST Switch 3D Gun Installation



### Typical Required Parts and Installation of SST Switch 3D Gun

The following parts are used in a typical installation of the SST Switch 3D Gun and are normally required. Some parts may vary depending on specific robot and options. SST Switch 3D Gun mounting kits may be purchased separately from Graco.

- 1 pc. Graco SST Switch 3D Gun with nozzle head and nozzle cap.
- 1 pc. robot mounting flange.
- 1 pc. anti-rotation bracket.
- 1 pc. **5 Pin Cable Kit, 17V857** for all SST Switch 3D Guns.
- 1 pc. **8 Pin Cable Kit, 15N265** for SST Switch 3D guns with temperature and/or pressure sensor.
- 2 pcs. guide pin Ø 6mm.
- 3 pcs. M6x20 hex socket head screws.
- 4 pcs. hex socket head screws.
- 3 pcs nozzle assembly kits.
- 1 pc. 8 mm polyurethane air hose.
- 1 pc. material supply hose with 1/2 in. BSPP fittings.



## Robot Mounting Flange

1. Attach the mounting flange onto the sixth axis of the robot with the required bolts supplied with the SST Switch 3D Gun mounting kit.
2. The mounting flange is then attached to the body of the SST Switch 3D Gun with three M6x20 hex socket screws. Torque to 98.2 in-lbs (11.1 N•m). It is important to make sure the 6mm guide pins supplied with the kit are inserted into the correct positions. See FIG. 2.

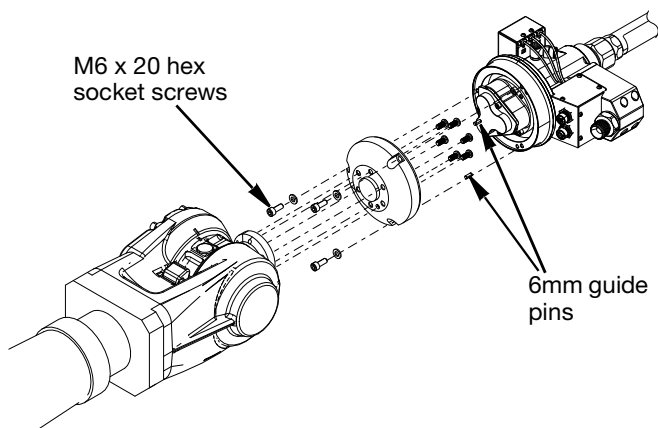


FIG. 2

## Anti-Rotation Brackets

After the SST Switch 3D Gun is mounted to the robot, the anti-rotation brackets must be attached to the swivel housing (511) and to the fixation point on the robot using the hex head screws. Exact fitting of the anti-rotation brackets will depend on the robot and kit being used. See FIG. 3 for installation example and page 31 for swivel housing part reference.

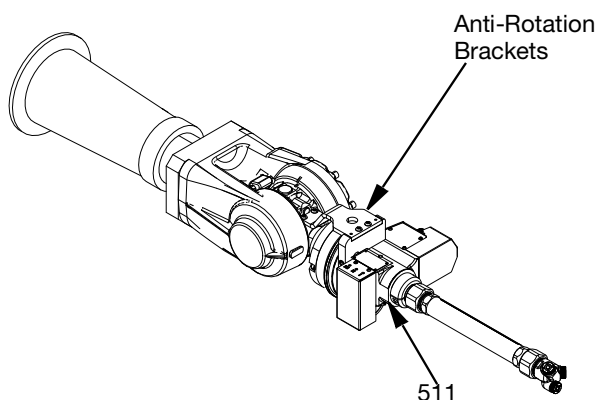


FIG. 3

## Nozzles

**NOTE:** Nozzles are not supplied with the SST Switch 3D Gun and must be purchased separately to match customer specifications. See **LASD Nozzle Kit Assembly** page No. 34, or **Spray Stream Nozzle Kits** and **Spray Stream Adapter Kit, 25U338** page No. 35 for nozzle type and size options.

## LASD Nozzle Style Attachment

**NOTE:** See **LASD Nozzle Assembly Kits 25U016 and 25U017** for constructing an LASD nozzle assembly.

1. Insert O-ring (707) into the 3 head adapter assembly (105).
2. Place small end of nut (706) against the 3 head adapter assembly (105) but do not tighten thread.
3. Align the pins of the nozzle assembly (705) and insert into the 3 head adapter assembly (105). Torque the nut (706) to 15 ft-lb (20.34 N•m) See FIG. 4.

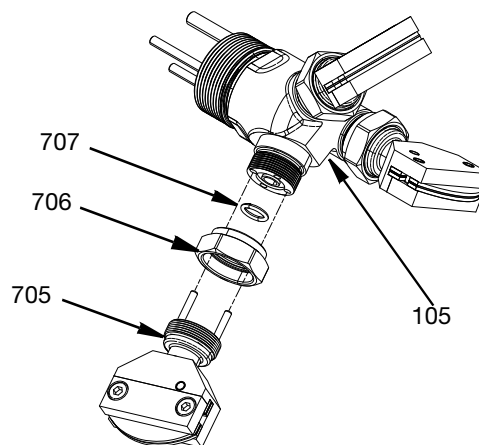


FIG. 4

## Spray Stream Nozzle Style Assembly.

1. Place the O-rings (707) into the 3 head adapter assembly (105).
2. Place an O-ring into each spray nozzle sealer adapter (902). The nozzles (801) are then inserted in the spray nozzle sealer adapter (902) making sure the nozzle is keyed into the spray nozzle sealer adapter.
3. Line up the dowel pins of the spray nozzle sealer adapter (902) with the 3 head adapter assembly (105), and secure together with the retaining nut (901) Torque to 15 ft-lb (20.34 N•m). See FIG. 5.

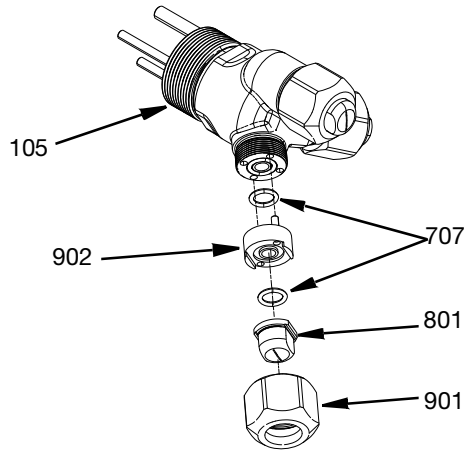


FIG. 5

### Cable Connections

**NOTE:** Cables and hoses are attached only after SST Switch 3D Gun is bolted to robot.

Connect cable (1001) for all SST Switch 3D Gun models, and (1003) for SST Switch 3D guns with sensors. Then connect other end of the cables by making the appropriate connections to the robot's control cabinet. See Fig. 6.

See the **Models** table page 3, for the cable type needed for your SST Switch 3D Gun mode.

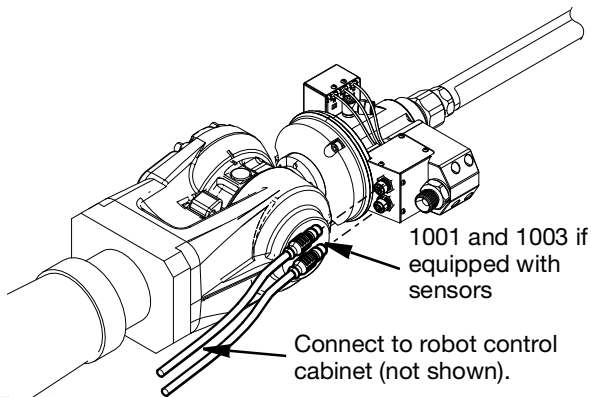


FIG. 6

### Hose Connections

**NOTICE**

Only use air fittings that are rated at a temperature equal to or higher than the operating temperature of the fluid dispensing system. Lower rated air fittings could melt and cause damage to the SST Switch 3D Gun.

The air supply is connected to the SST Switch 3D Gun with an 8 mm polyurethane hose to the elbow swivel fitting (512) on the side of the swivel housing (511).

Customer must install air bleed valve between air supply and SST Switch 3D Gun connection. See FIG. 7. The material supply hose connects to the SST Switch 3D gun using a customer supplied fitting. The inlet thread is 1/2 In. BSPP. See FIG. 7.

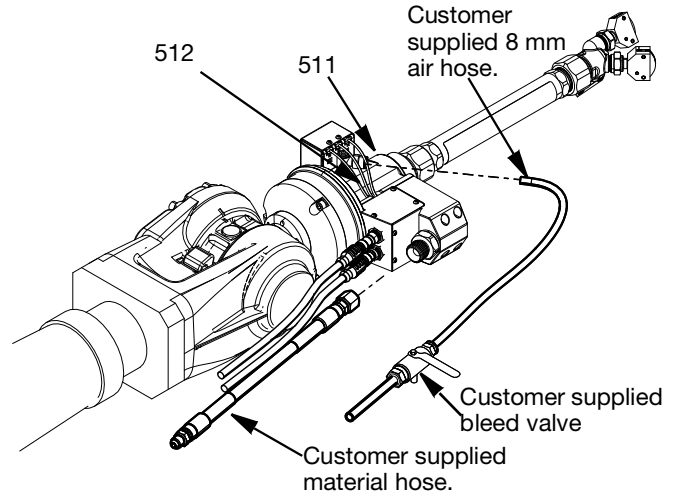
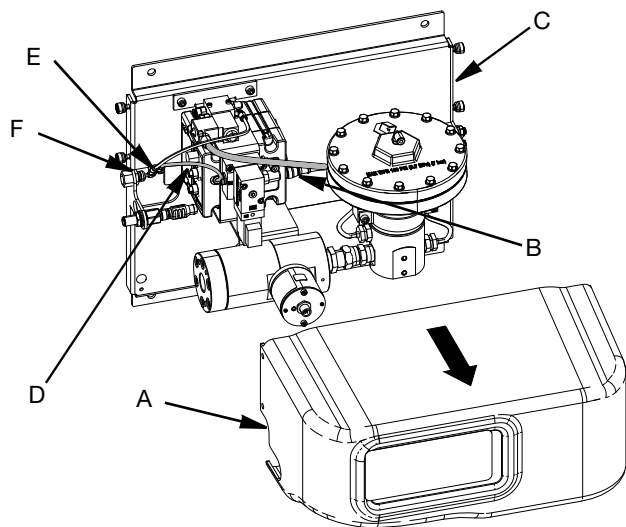


FIG. 7

### PCF Installation

**NOTE:** The following installation is for SST Switch 3D Guns that use a Precision Continuous Flow Unit (PCF). See **PCF to 3D Gun Cable Kit 25U441** on page 36 for parts.

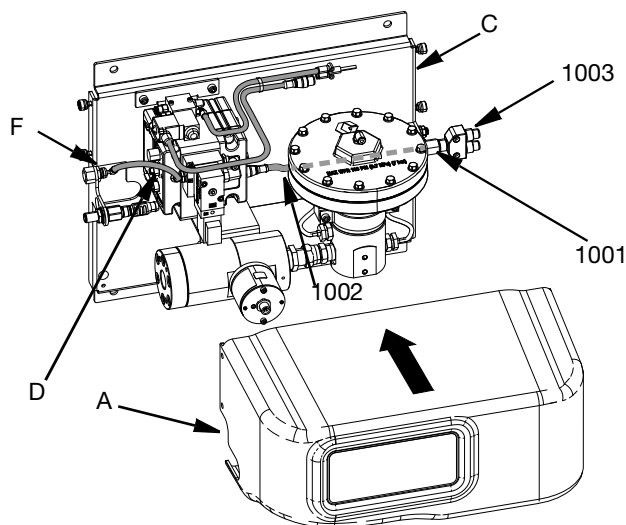
1. Remove the PCF cover (A).
2. Disconnect the dispense valve air solenoid cable from FCM port 1(B). Secure the loose end of the cable to the PCF fluid mounting plate (C).
3. Disconnect the regulator air line (D) from the incoming air wye fitting (E).
4. Disconnect the incoming air wye fitting (D) from the incoming air elbow fitting (F). Secure the incoming air wye fitting to the PCF fluid mounting plate (C). See FIG. 8 page 11.




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**FIG. 8**

5. Insert the regulator air line (D) into the incoming air elbow fitting (F).
6. Install the M12 thru connector (1001) into the PCF fluid mounting plate (C).
7. Install the GCA M12 cable (1002) to FCM port 1 and M12 thru connector (1001).
8. Reinstall the PCF cover (A). See FIG. 9.




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**FIG. 9**

### Check for Free Movement

After completing the installation of the hoses and cables, the free movement must be checked by moving the fifth axis of the robot. The hoses and cables must be able to move freely without stretching or scratching the robot arm.

### Flush SST Switch 3d Gun Before Using

The SST Switch 3D Gun was tested with lightweight mineral oil, which is left in the fluid passages to protect parts. To avoid contamination with oil, flush the SST Switch 3D Gun with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.

### Leak Test and Priming for Use

After the SST Switch 3D Gun is completely installed on the robot, the SST Switch 3D Gun can be tested for leaks. This procedure also primes the SST Switch 3D Gun for use.

- a. Open the air supply. There must be no sound from leaking air.
- b. Check that the solenoid valves (518), shown on **Swivel Chamber** page 31, are working properly by opening and closing each valve from the robot pendant and listen to the sound of the piston in operation.
- c. Apply material supply pressure and check for leakage.
- d. Position the SST Switch 3D Gun into a grounded metal pail and purge all nozzles one by one until the unit is completely filled with material and all entrapped air is removed from the supply system.

# Operation

## Operation Overview

The SST Switch 3D gun dispenses ribbons of material onto a substrate. The height and width of the material bead is dependent on the nozzle selection, flow rate of the material and the speed of the robot movement. The size of the bead can also be determined by the size of the nozzle. See **Performance Charts** starting on page 39 to help determine settings of the SST Switch 3D Gun.

## Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection and splashing fluid, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

This procedure describes how to relieve pressure from the SST Switch 3D Gun. See your supply system manual for instructions on relieving pressure from the entire system.

1. Shut off the material supply.
2. Position the SST Switch 3D Gun into a grounded metal pail to relieve the fluid pressure.
3. Relieve all air pressure in the air lines by shutting off the Customer supplied bleed valve. See FIG. 7.
4. If the nozzle tip or material hose is clogged or if pressure has not been fully relieved after following the steps above, very slowly loosen the customer supplied material hose from the 1/2 in. BSPP inlet fitting (604), (see FIG. 7).

## Flush the SST Switch 3D Gun



To avoid fire and explosion, always ground equipment and waste container. To avoid static sparking and injury from splashing, always flush at the lowest possible pressure.

- Flush at the lowest pressure possible. Check connectors for leaks and tighten as necessary.
- Flush with a fluid that is compatible with the fluid being dispensed and the equipment wetted parts.

## Setup



1. With the SST Switch 3D Gun fully primed and cable connections integrated into the robot control system, the SST Switch 3D Gun is ready for dispensing material onto the substrate.
2. Calculate the flow rate by the required height and width versus the robot speed.
3. Adjust the material control system supplied with the robot to the required flow rate.
4. Program the robot with the desired nozzle used to dispense the material. The nozzle must be perpendicular to the substrate.
5. Run the program and validate the height and width of the bead.
6. The flow rate, robot speed, and nozzle size can be adjusted to achieve the desired height and width of the material bead.
7. Nozzle distance from target can affect the quality of the bead. The further the nozzle is from target the more air can be trapped between the bottom of the bead and substrate.
8. After the correct height, width, and quality of the bead is confirmed, the SST Switch 3D Gun is ready for dispensing.

# Maintenance



**NOTE:** Before disassembly, make sure all spare parts are available (new in an unopened package if delivered), and other parts are thoroughly cleaned. Suitable lubricant and thread locking compound should also be available.

Inspect the SST Switch 3D Gun, material, and air lines at least once every two weeks. Inspect for leakage and other visible damage.

The following tables list recommended maintenance procedures and frequencies for typical usage. The maintenance is divided between mechanical and electrical tasks. A typical application is the SST Switch 3D Gun mounted on a robot dispensing a moderately abrasive sealant.

## Maintenance Table

Task	Schedule
Check the applicator for material leakages by visual inspection.	Daily
Listen carefully for air leakages.	Daily
Clean the gun thoroughly.	Daily
Inspect hoses and cables for excessive wear.	Weekly
Check the leakage detection hole on the swivel chamber and all connections.	Weekly
Check and tighten mounting connections	Weekly
If possible, run a spray test on a spray test table.	Weekly
Replace the needle packings.	If a normal PVC material and supply pressure are used, replace after 1,000,000 cycles (1 cycle = open and close). If normal LASD material and supply pressure are used, replace after 250,000 cycles.
Inspect needles for wear when replacing needle packing	Replace needles if needle coating has worn through and base material of needle is exposed.
Change the sealing rings in the swivel chamber	After 500,000 revolutions

## Preventive Maintenance

Typical wear parts in the SST Switch 3D Gun are the rotary seals (508) inside the swivel housing, the needle ball shutoff valves (418), and needle packing (411) seals.

Due to the different materials that can be used in the SST Switch 3D Gun, the frequency for preventative maintenance has to be evaluated for each case of application.

Based on average usage, **Yearly Service Kit, 25U328** is provided for maintenance once a year and **Service**

**Kit, 25T485** is provided for maintenance once every two years (see page 37). Both of these kits are can be purchased through Graco.

1. Dismount and disassemble the SST Switch 3D Gun. See **SST Switch 3D Gun Disassembly** starting on page 17.
2. Reassemble the SST Switch 3D Gun. See **Remove the Material Inlet Block** starting on page 17. Then test all functions of the SST Switch 3D Gun, to make sure that all parts are installed correctly.

## Factors Affecting SST Switch 3D Gun Life

The maintenance table should be used as a guideline for the frequency of maintenance tasks. Additional factors that could affect SST Switch 3D Gun life include the following:

- **Material Fluid** - Abrasive or fiber filled fluids are much harder on seals, shafts, and seats than non-abrasive fluids such as oil.
- **Pressure drop across the valve seat** - As the internal valves open or close, the fluid is accelerated to a high velocity at the rod shutoff valve/seat contact area. The rate of wear at the rod shutoff valve/seat contact area will be much greater at 3000 psi than at 1000 psi. Changing the tip size to reduce fluid velocity can have a substantial affect on wear.
- **Number of cycles** - This has a much greater affect on SST Switch 3D gun wear than number of gallons. If you can do the same job with fewer on/off cycles, the SST Switch 3D Gun will last longer.
- **Speed of actuation** - Opening and closing the internal valves quickly will increase rod shutoff valve and seat life.

## Recycling and Disposal

### End of Product Life

At the end of the product's useful life, dismantle and recycle it in a responsible manner.

- Perform the **Pressure Relief Procedure**, Page 12
- Drain and dispose of fluids according to applicable regulations. Refer to the material manufacturer's Safety Data Sheet.
- Remove circuit boards, and other electronic components. Recycle according to applicable regulations.
- Deliver remaining product to a recycling facility.

# Troubleshooting



**NOTE:** Follow **Pressure Relief Procedure**, page 12, before checking or repairing the SST Switch 3D Gun.

Problem	Cause	Solution
Air leaks from SST Switch 3D Gun.	Worn gasket.	Replace gasket.
	Loose or worn air connections.	Tighten air connections.
	Worn O-rings.	Replace O-rings.
	Loose end cap screws.	Tighten screws.
Material leaks from front of SST Switch 3D Gun.	Tip seal or seats are worn.	Replace seat seals.
		Replace nozzle head assembly
		Replace rod shutoff valve.
	Obstruction inside SST Switch 3D Gun.	Remove nozzle head.
Material leaks from SST Switch 3D Gun weep hole.	Seals not installed correctly.	Check rotary seals and replace as needed.
	Seals are worn.	
SST Switch 3D Gun does not shut off.	Loose air connections or air supply turned off.	Tighten air connections and turn on air.
	Worn rod shutoff valve-seat interface.	Replace nozzle head and rod shutoff valve rod shutoff valve seat.
	Broken piston, debris in air cylinder, or debris inside the fluid section.	Disassemble SST Switch 3D Gun. Check and if necessary replace, piston, piston rod, and O-rings.
	Spring broken or not installed correctly.	Disassemble SST Switch 3D Gun. Check spring and replace if necessary.
SST Switch 3D Gun does not open or dispense material.	Loose air connections or air supply turned off.	Tighten air connections.
	Broken rod, piston, or tip. Debris or cured material inside fluid section.	Disassemble SST Switch 3D Gun. Check and if necessary replace, piston, piston rod, and O-rings.
	Loosen the retaining set screws located in the piston.	Confirm the piston rod is fully inserted into the piston and tighten set screws

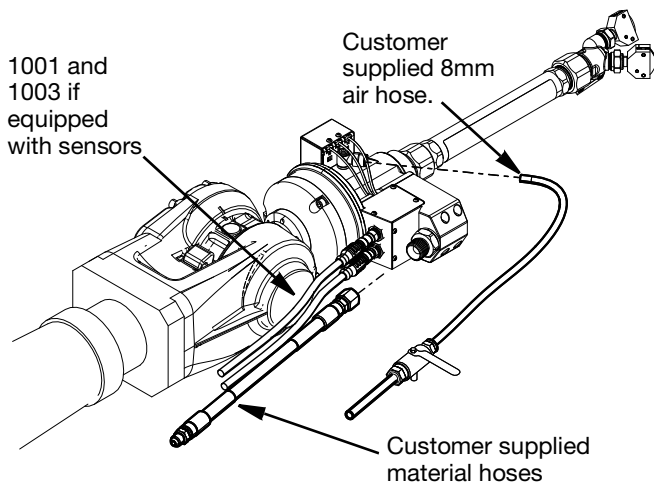
# Repair

				
To help prevent serious injury from pressurized fluid, relieve pressure before cleaning, checking or servicing the equipment				

## Removal of SST Switch 3D Gun From Robot for Repair

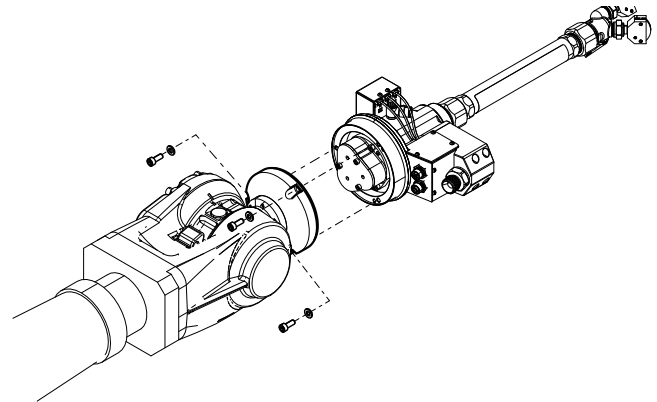
**NOTE:** Clean the SST Switch 3D Gun, robot and all parts surrounding it before removing the SST Switch 3D Gun.

1. Make sure air and material pressures are relieved.
  - a. Follow the **Flush the SST Switch 3D Gun** page 12.
  - b. Follow the **Pressure Relief Procedure** page 12.
2. Disconnect the material inlet hose. Always use two wrenches when loosening the high pressure hose connection.
3. Disconnect the 8mm air hose.
4. Unplug the cable connectors by unscrewing the fitting on the 5 pin cable connector (1001) and 8 pin cable connector (1003) if fitted. See FIG. 10.



**FIG. 10**

5. Remove the screws that attach the swivel housing (511) to the anti-rotation bracket.
6. Unscrew the three screws that mount the SST Switch 3D Gun to the robot mounting flange. See FIG. 11.



**FIG. 11**

7. The SST Switch 3D Gun can now be removed from the robot.



## SST Switch 3D Gun Disassembly

The SST Switch 3D Gun can be disassembled after being removed from the robot. See **Removal of SST Switch 3D Gun From Robot for Repair**.

### NOTICE

Materials dispensed by the SST Switch 3D Gun are extremely abrasive, harden quickly and the parts must be thoroughly cleaned before or during any disassembly and repair or damage can occur to components.

### Remove Cover Plates

1. To access SST Switch 3D gun internal parts, remove side covers (605), top cover (606) and outer cover (520), by removing screws (519) with a hex key wrench. See FIG. 12.

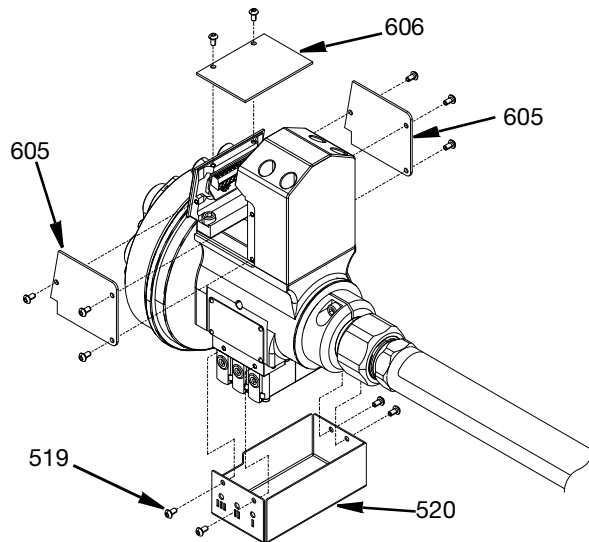


FIG. 12

### Remove Electrical Components

1. Disconnect solenoid valve cable connections (617) from solenoid valves (518).
2. Solenoid valves (518) can be removed from the air valve manifold (516) by the screws attached to the solenoid valves.
3. Remove the dual connector bracket (616) with the dual cable connector (614) attached by removing the two screws (615) with a hex key wrench.
4. Remove the RTD sensor (609), pressure transducer (610) and 10mm washer seals (607) if equipped. Washer seals should be replaced with new ones before reassembly. See FIG. 13.

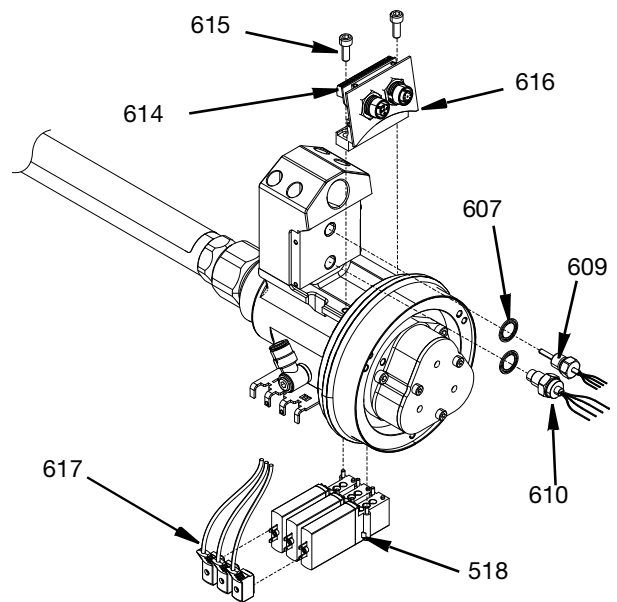


FIG. 13

### Remove the Material Inlet Block

1. Remove customer supplied inlet fitting and 1/2 in. BSPB washer seal (603).
2. Take off the SST single inlet adapter (602) by removing the four M5 SHCS screws (601) with a hex key wrench.
3. Discard packing Viton O-ring (613) and replace with a new one when reassembling. See FIG. 14.

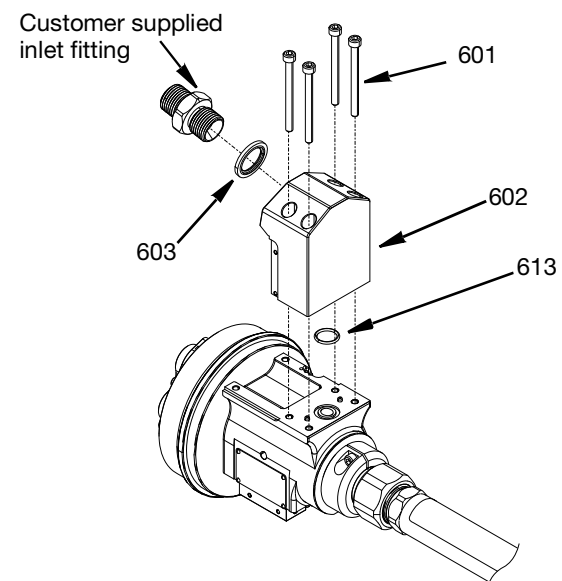


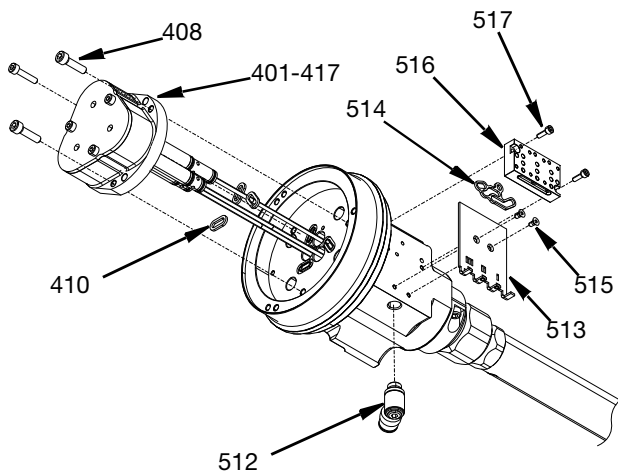
FIG. 14

## Remove the Pneumatic Section

1. Air cylinder assembly (401-417) and needle ball shut off valves (418) are removed together by removing the three M5 SHCS screws (408).

**NOTE:** Be careful to not damage or bend the needle ball shut off valves (418) when extracting from housing. Various seals and gaskets that are discarded in the following procedures need to be replaced by new before reassembly.

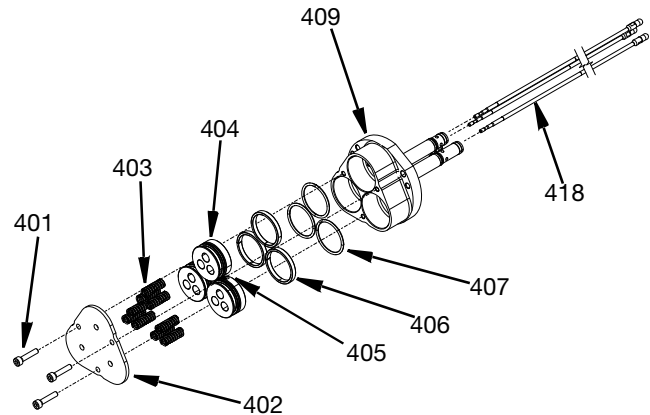
2. Air gaskets (410) should be discarded.
3. Remove air manifold (516) by removing M3 SHCS screw fasteners (517) with a hex key wrench. Air gasket (514) should be discarded.
4. Remove inner cover (513) by removing M3 flathead screws (515) with a hex key wrench.
5. Remove the 1/8 in. BSPP swivel elbow fitting (512) with a hex key wrench. See FIG. 15.



**FIG. 15**

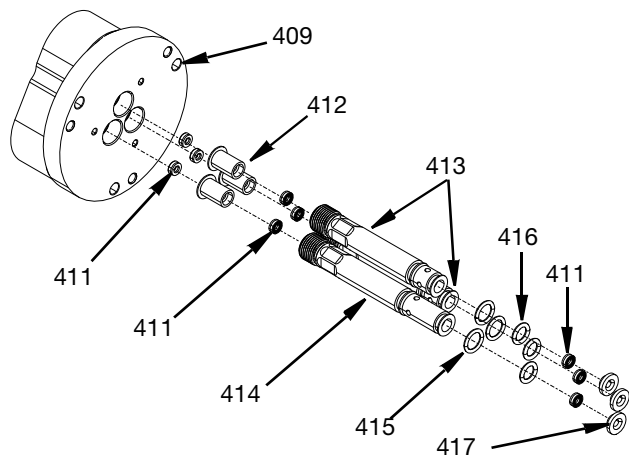
## Remove Pneumatic Section

1. Detach cylinder cover (402) by removing three M4 SHCS screws (401) with hex key wrench. Loosen screws evenly because the cover is under spring (403) tension and could bind when removed.
2. Loosen M3 set screws (405) three turns each and pull ball shut off needles (418) out of the assembly. See FIG. 16.
3. Extract pistons (404) from air cylinder housing (409). Discard guide rings (406) and O-rings (407).



**FIG. 16**

4. Remove short and long seal bearing guides (413 and 414) with a 10mm wrench.
5. Using a knife edge tool or screwdriver, carefully pry the lower bearings (417) out of the seal bearing guides (413-414). Discard lower bearings.
6. Using a hook tool extract the needle packing (411) seals from the seal bearing guide side and discard.
7. Remove the two needle packing (411) seals and upper bearings (412) from the seal bearing guides and discard the needle packing and upper bearings.
8. Remove the O-rings (415), and split ring seals, (416) and discard. See FIG. 17.



**FIG. 17**

## Nozzle Adapter Removal

1. Loosen the turnbuckle locking nut (101) by turning it counter clockwise as seen facing the main body of the SST Switch 3D Gun. The nut rotation will separate the 3 head adapter assembly (105) away from the long tube assembly (103).
2. Discard adapter gasket (102) and valve shut off bearing (104). See FIG. 18.

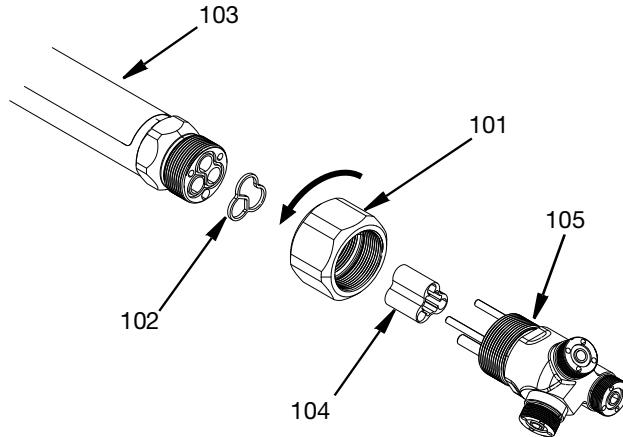


FIG. 18

## Central Body Removal

1. Loosen the turnbuckle locking nut (101) by turning it counter clockwise as seen facing the main body of the SST Switch 3D Gun. The nut rotation will separate the long tube assembly (103) away from the center body (301). Discard adapter gasket (102).
2. Loosen the two M5 SHCS screws (203) with a hex key wrench and remove the lock ring assembly (201) along with the washer (202).
3. To release the pressure on the internal seals and ease disassembly, align access holes on the center body (301) with the four M6 screws (503) and loosen the screws.
4. Tap the center body (301) out of the swivel housing assembly (511) using a soft face mallet. See FIG. 19.

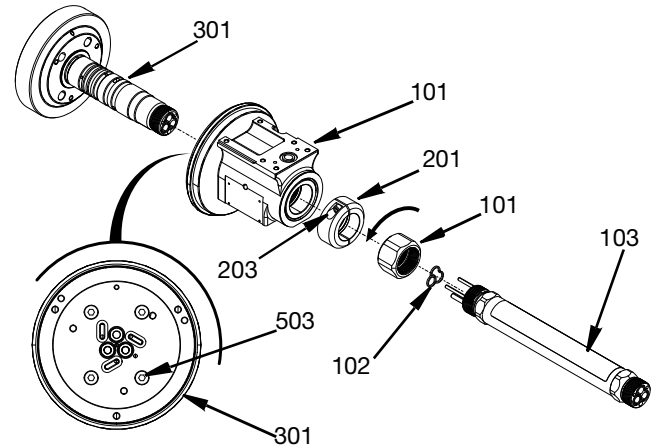


FIG. 19

## Swivel Housing Disassembly

1. Dust seal ring (501) can be removed from the air distribution ring bearing (504)
2. Remove flange bearings (502) and discard.
3. Remove M6 flathead screws (503) with a hex key wrench and remove the air distribution ring bearing (504).
4. Remove the four O-rings (505) and four air seals (506) from the air distribution ring bearing (504) and discard.
5. Tap the internal components (507-510) out of the swivel housing assembly (511). It is recommended to use seal installation /removal tool 17V972 and a soft face mallet to tap the internal components from the swivel housing.
6. Discard the rotary seals (508). See FIG. 20 on page 20.

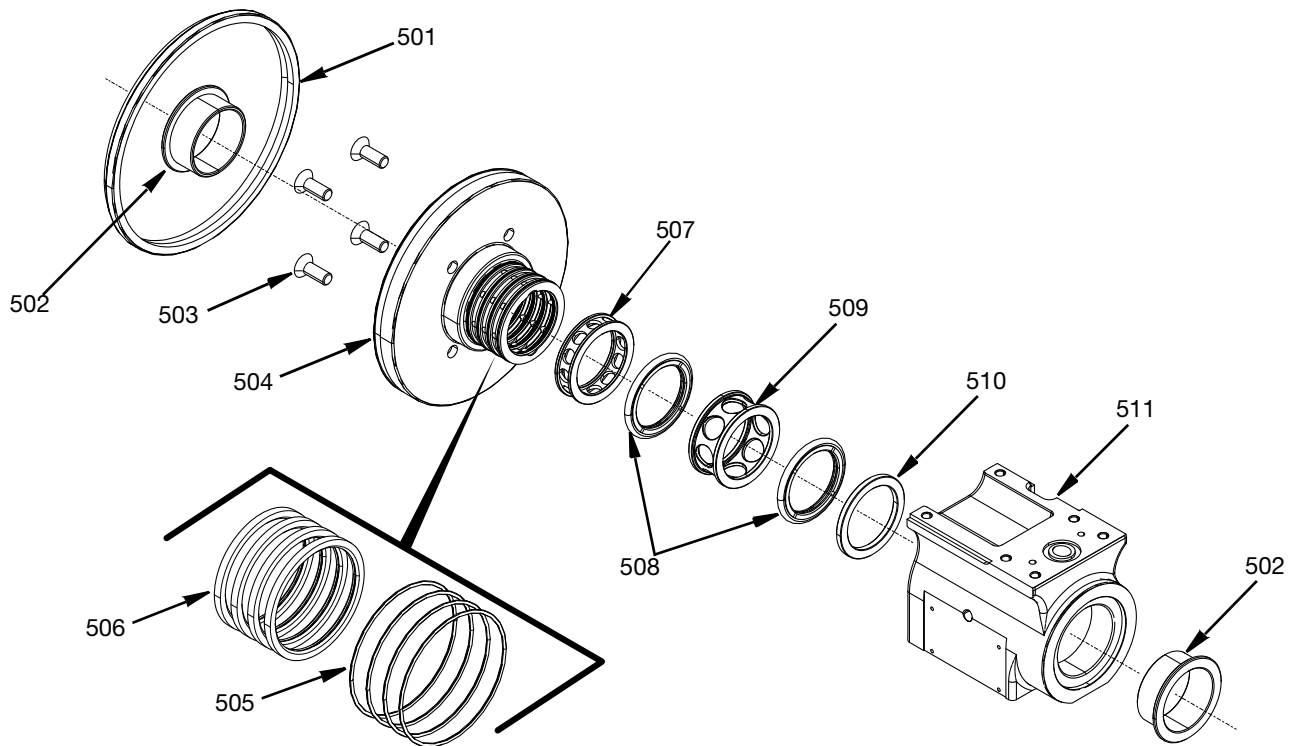


FIG. 20

## SST Switch 3D Gun Assembly

**NOTE:** Before assembly, It is recommended to have **Yearly Service Kit, 25U328** on page No. 37. Make sure parts are thoroughly cleaned. Refer to the fastener torque settings in the **Technical Specifications** on page No. 50. Suitable lubricant and thread locking compound should also be available.

### Swivel Housing Assembly

**NOTE:** For general sequence of swivel housing assembly refer to FIG. 20.

**NOTE:** Medium strength thread locker used for this assembly is Loctite® 242 or equivalent. Anti seize lubricant used for this assembly is Loctite® 77164 or equivalent.

1. Insert support ring (510) into the larger bore end of the swivel housing assembly (511) until the support ring is square against the internal shoulder.
2. Apply a thin coat of lithium grease onto the outside of the O-ring on the rotary seal (508). To prevent damage to the Rotary seal O-ring insert into the bore of the swivel housing (511) at an angle. Make sure that the O-ring does not tear against the inlet opening and push the rotary seal against the support ring (510). See side view FIG. 25.

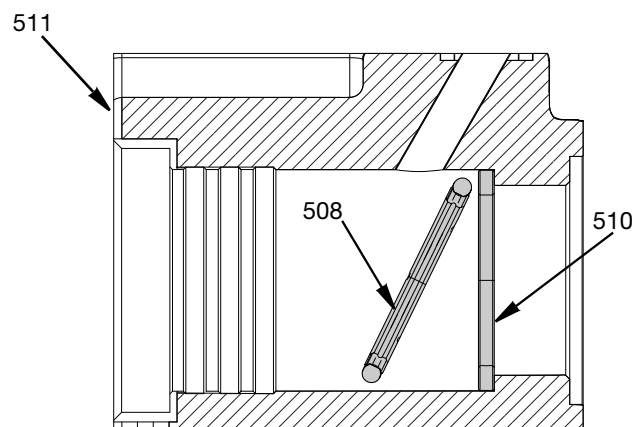


FIG. 21

3. Insert material distributor ring (509) into the bore of the swivel housing (511). It is recommended to use the **Material Seal Insertion/Removal Tool, 17V972** on page No. 38 and a soft faced mallet. Push the material distribution ring (509) and rotary seal (508) fully to the bottom of the bore.

4. Apply a thin coat of lithium grease onto the outside of the next O-ring on the rotary seal (508). To prevent damage to the Rotary seal O-ring insert into the bore of the swivel housing (511) at an angle. Make sure that the O-ring does not tear against the weepage port and push the rotary seal against the material support ring (509). See top view FIG. 25.

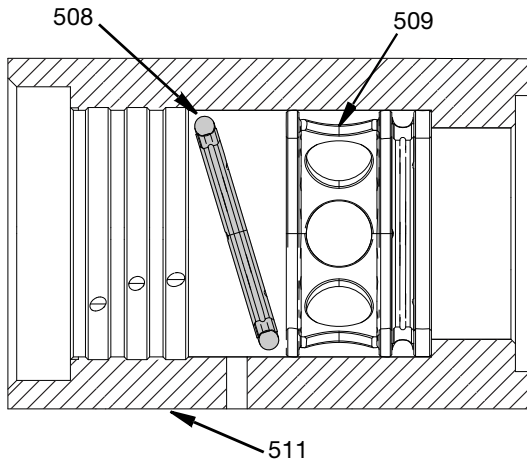


FIG. 22

5. Insert weepage distributor ring (507) into the bore of the swivel housing (511). It is recommended to use the **Material Seal Insertion/Removal Tool, 17V972** on page No. 38 and a soft faced mallet. Push the weepage distributor ring and rotary seal (508) fully against the material support ring (509). See FIG. 23.

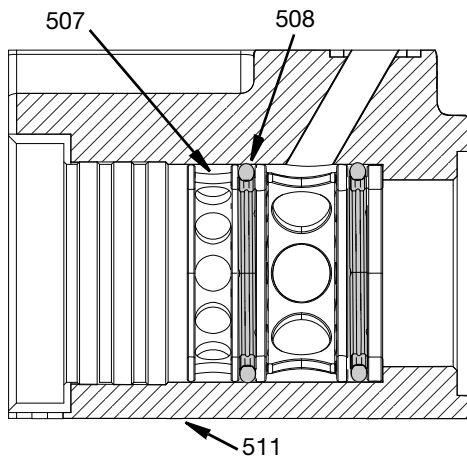


FIG. 23

6. Install the O-rings (505) and air seals (506) onto the air distribution ring bearing (504). See FIG. 24.

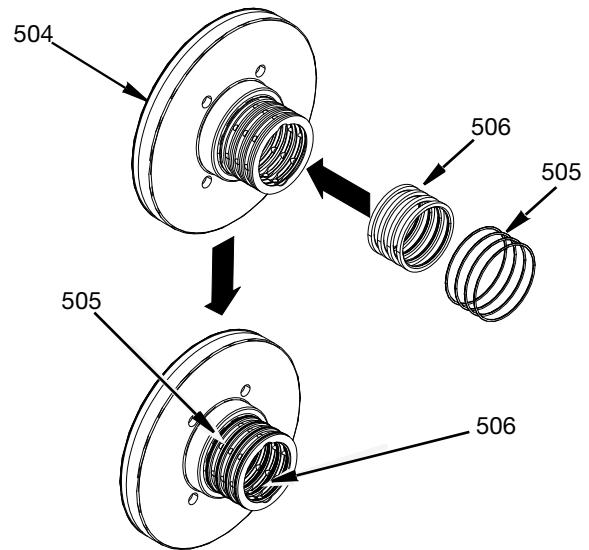


FIG. 24

7. Apply a thin coat of lithium grease to the O-rings (505) and insert into the bore of the swivel housing (511). Apply anti seize to M6 flathead socket screws (503) and thread in finger tight. See FIG. 25.
8. Push one flange bearing (502) into the swivel housing (511), and one flange bearing (502) into the air distribution ring bearing (504). See FIG. 25.
9. Install dust seal ring (501) around the outside surface of the air distribution ring bearing (504). See FIG. 25.

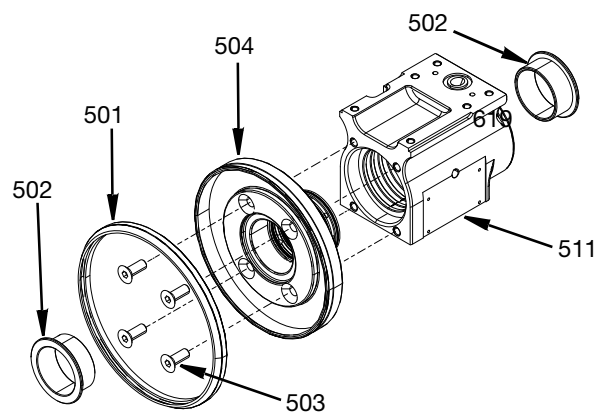


FIG. 25

### Center Body Assembly

1. Apply a thin coat of lithium grease to the sealing diameters of the center body (301) and insert into the swivel housing assembly (511).

## Repair

- Align the four access holes in the center body (301) with the M6 flathead socket screws (503) in the swivel housing assembly (511). Torque fasteners to 80 in-lb (9.0 N•m).

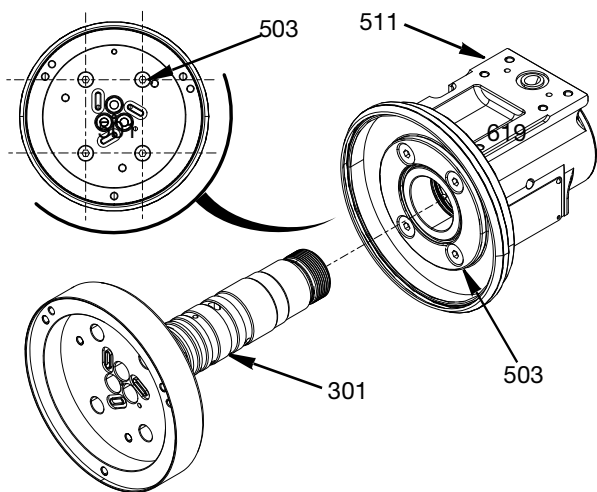


FIG. 26

- With a soft face mallet, gently tap the center body (301) into the swivel housing assembly (511) to ensure the center body is positioned against the flange bearing (502).
- Slide the lock ring assembly (201) onto the shank of the center body (301) and into place against the flange bearing (502). Ensure that the pin in the one half of the lock ring (201) is engaged in the hole of the washer (202).
- Apply anti seize to the two M5 SHCS screws (203) and torque to 57.5 in-lb (6.5 N•m). See FIG. 27.

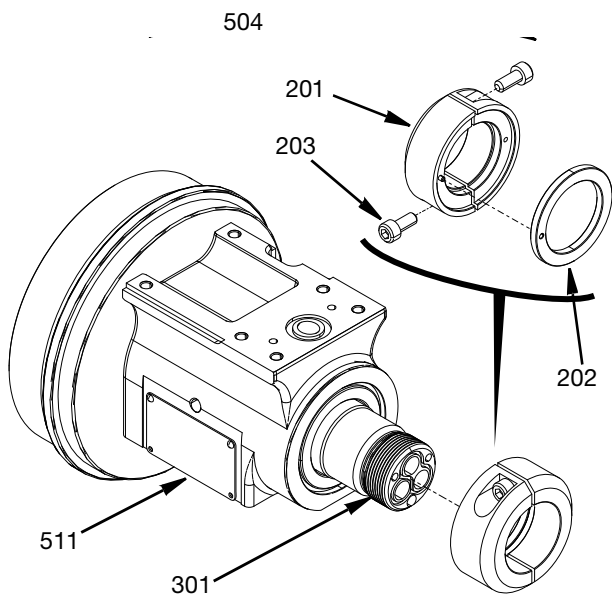


FIG. 27

## Material Tube Assembly

- Apply a thin coat of lithium grease to the adapter gasket (102) and install into the end of the center body (301).
- Apply anti seize to lubricant to threads of center body (301) and long tube assembly (503).
- Rest the turnbuckle locking nut (101) on the threaded end of the center body (301) but do not thread on.
- Align and insert the pins on the end of the long tube assembly (103) into the central body (301). Turn the turnbuckle nut clockwise as seen facing the swivel housing so that the threads of the long tube assembly (103) and center body engage simultaneously. Torque the nut to 75 ft-lb (101.69 N•m). See FIG. 28.

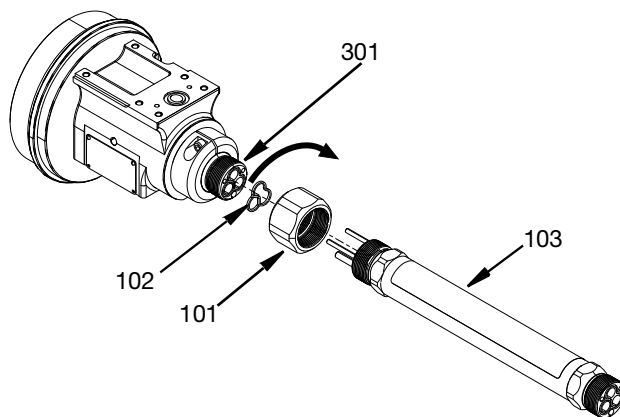


FIG. 28

## Nozzle Group Assembly

- Install adapter gasket (102) into the end of the long tube assembly (103). Install valve shut off bearing (104) onto the ball shut off needles (418).

**NOTE:** The open end of the valve shut off bearing (104) must towards the dispensing nozzles.

- Apply anti seize lubricant to the threads of the long tube assembly (103) and the 3 head adapter assembly (105).
- Rest the turnbuckle locking nut (101) on the threaded end of the long tube assembly (503) but do not thread on.

**NOTE:** Refer to **Nozzle Head and Material Tube Assembly** on page 28 to determine which 3 head adapter assembly goes with which model number.

4. Insert the dowel pins of the 3 head adapter assembly (105) into the long tube assembly (103). Turn the turnbuckle nut clockwise as seen facing the swivel housing so that the threads of the long tube assembly (103) and the 3 head adapter assembly (105) engage at the same time. Torque the nut to 75 ft-lb (101.69 N•m). See FIG. 29.

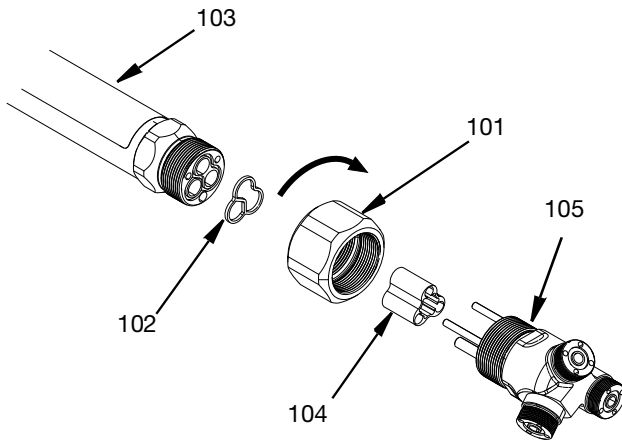


FIG. 29

### Air Cylinder Section Assembly

1. Install O-rings (415) and then split ring seals (416) onto the short bearing seal guide (413) and the long bearing seal guide (414).
2. Install one needle packing seal (411) into the short and long bearing seal guides (413 and 414) O-ring end. Open spring side of needle packing seals need to face outwards.
3. Press the lower bearing (417) into the O-ring end of the short and long bearing seal guides (413 and 414).
4. Insert two needle packing seals (411) into each upper bearing (412). Open spring side of needle packing seals need to face outwards on either side of the upper bearing. Insert this assembly into the threaded end of the bearing seal guides (413 and 414). See FIG. 30.

**NOTE:** FIG. 30 shows a short seal bearing guide (413) however both long and short guides are assembled the same.

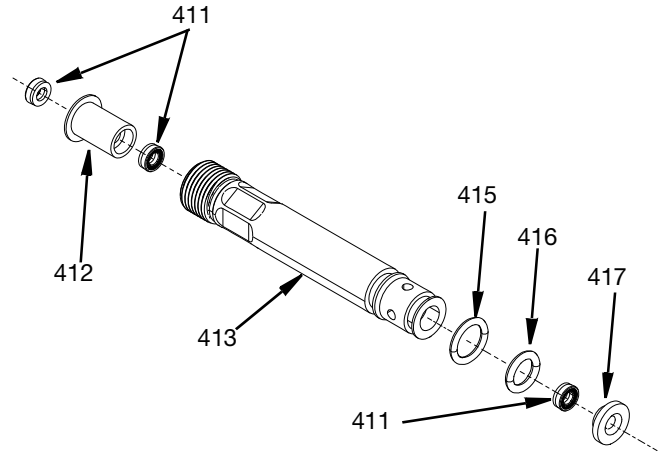


FIG. 30

5. Apply a single drop of medium strength thread locker to the threads of the short and long bearing seal guides (413 and 414) and screw into the air cylinder housing (409). Torque to 15 ft-lb (20.34 N•m) See FIG. 31.

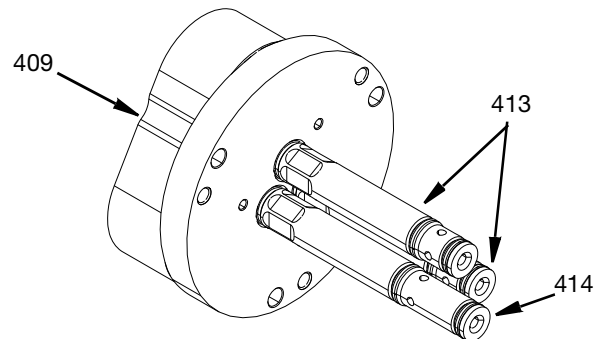
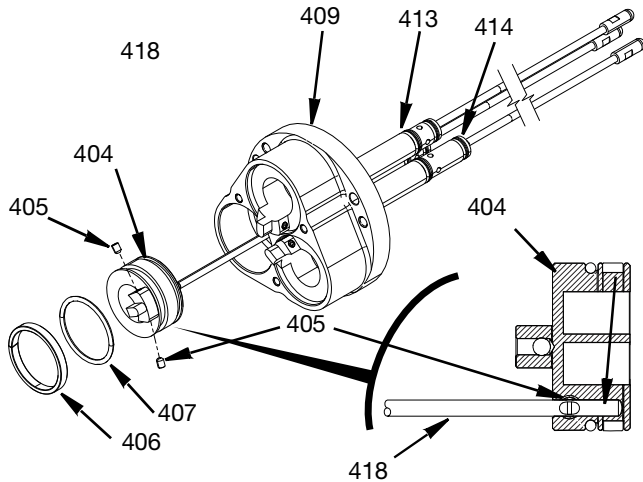


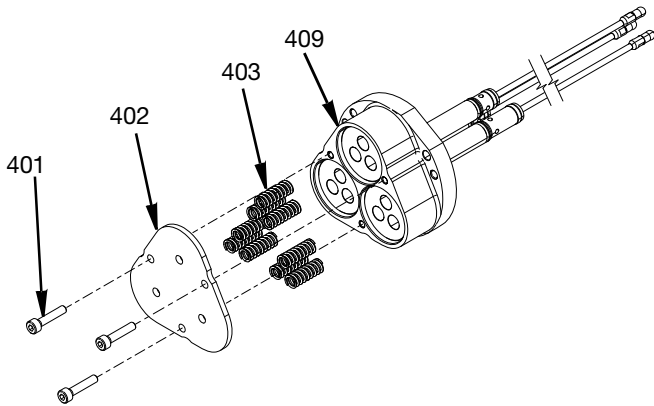
FIG. 31

6. Apply a thin coat of lithium grease to the ball shut off needles (418) and insert through the short and long bearing seal guides (413 and 414).
7. Install O-rings (407) and guide rings (406) onto pistons (404).
8. Place pistons (404) onto ball shut off needles (418) in the bores of the air cylinder housing (409) until the pistons bottom out in the bores of the air piston housing. See FIG. 32.



**FIG. 32**

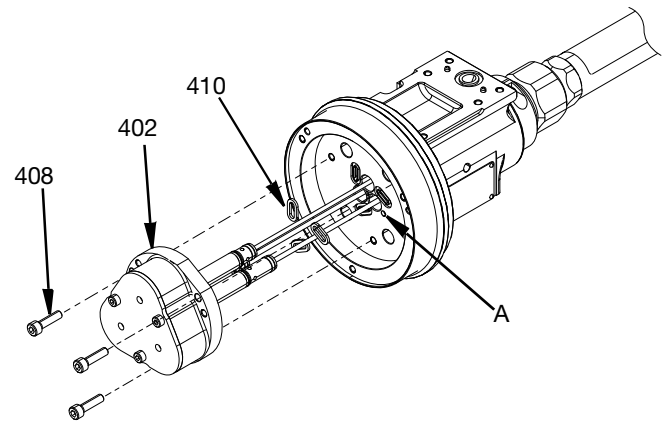
9. Install springs (403) and cylinder cover (402). Install M4 SHCS screws (401) through cylinder cover into air cylinder housing (409). Apply anti seize to screws (401), and tighten down M4 SHCS screws (401) evenly to compress springs without binding assembly. Torque M4 screws to 29.2 in-lb (6.5 N•m). See FIG. 33.



**FIG. 33**

10. Apply a thin coat of lithium grease to the air gaskets (410) and insert into the center body (301).
11. Apply a thin coat of lithium grease to O-rings (415) and split ring seals (416). Insert the air cylinder assembly into the center body (301). Apply anti seize onto the M5 screws (408) and torque to 57.5 in-lb (6.5 N•m).

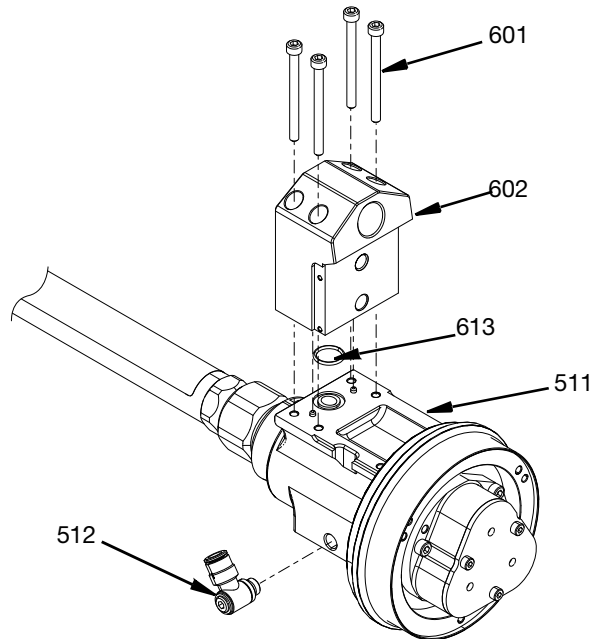
**NOTE:** The dimple (A) in the face of the center body (301) lines up with the long bearing seal guide (414). See FIG. 34.



**FIG. 34**

### Connection Housing Assembly

1. Apply a thin coat of lithium grease to O-ring (613) and locate it on the swivel housing (511). Locate the SST single inlet adapter (602) on the dowel pins and place onto the swivel housing (511). Apply anti seize to the four M5 SHCS screws (601) and torque to 57.5 in-lb (6.5 N•m).
2. Apply a thin coat of lithium grease to the seal on the 1/8 in. BSPP elbow fitting (512). See FIG. 35.



**FIG. 35**

3. Attach inner cover (513) to the swivel housing assembly (511) with two M3 flathead screws (515) and torque to 8 in-lb (0.9 N•m).
4. Apply a thin coat of lithium grease to air gasket (514). Locate air valve manifold (516) dowel pins onto the swivel housing assembly (511). Apply anti seize and insert two M3 SHCS fastener screws (517) and torque to 8 in-lb (0.9 N•m).



- Attach air valves (518) with their included captured screws onto the air valve manifold (516). Install solenoid valve cable connections (617) to air valves. See FIG. 36 page 25.

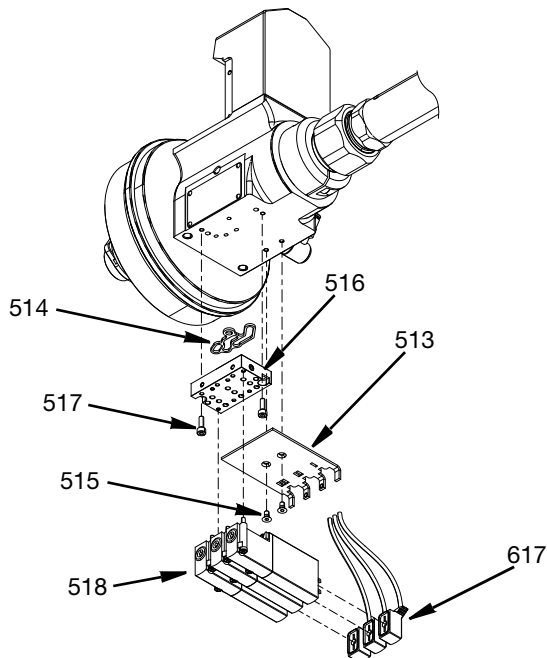


FIG. 36

- Apply a thin coat of lithium grease to the threads of the M10 hex head cap screw (608) and 10MM seal washer (607). Apply a thin coat of lithium grease to the threads of the SST M10 plug (612) and copper washer (611) and install into the and install into the SST single inlet adapter (602). Torque to 15 ft-lb (20.34 N•m). If sensors are an option, apply a thin coat of lithium grease to the threads of the RTD sensor (609) and pressure transducer (610) if used and their 10MM seal washers (607). Install the sensors and torque to 15 ft-lb (20.34 N•m).

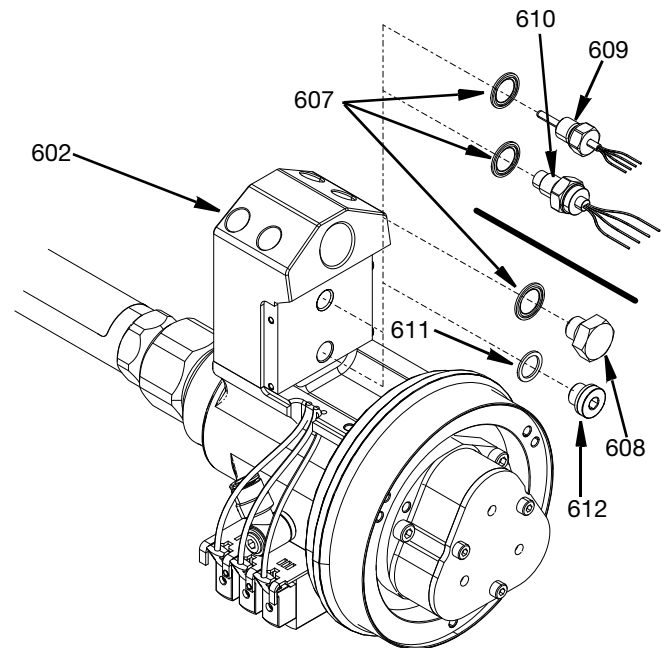


FIG. 37

- Connect solenoid valve cable connections (617) and if equipped, sensor wires from the RTD sensor (609) and /or pressure transducer (610) to the dual cable connector (614). See **5 Pin - No Sensor for 25T991 and 25T994** on page 47 and **5 Pin and 8 Pin Connections for Temperature and Pressure Sensors. Model No. 25T992, 25T993, 25T995 and 25T996** page No. 48.
- Install dual cable connector (614) into dual connector bracket (616) and tighten nuts. Apply anti seize and attach connector bracket to the swivel housing assy (511) with two M5 SHCS screws (615) and torque to 57.5 in-lb (6.5 N•m). See FIG. 38.

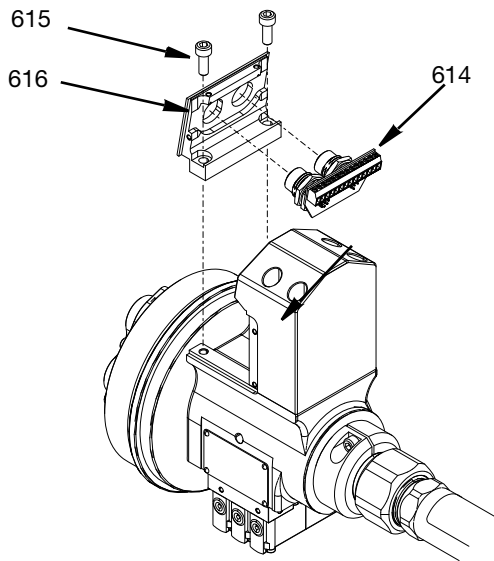


FIG. 38

9. Install cover plates including the outer blue cover (520), two side blue covers (605) and top blue cover (606) with twelve M3 BHCS screws (514) torqued to 12 in-lb (1.35 N•m).
10. Apply a thin coat of lithium grease to the 1/2 in. BSPP washer seal (603) and threads of the customer supplied inlet fitting. Thread into the SST single inlet adapter (602) and torque to Torque to 15 ft-lb (20.34 N•m). See FIG. 39 page 26.

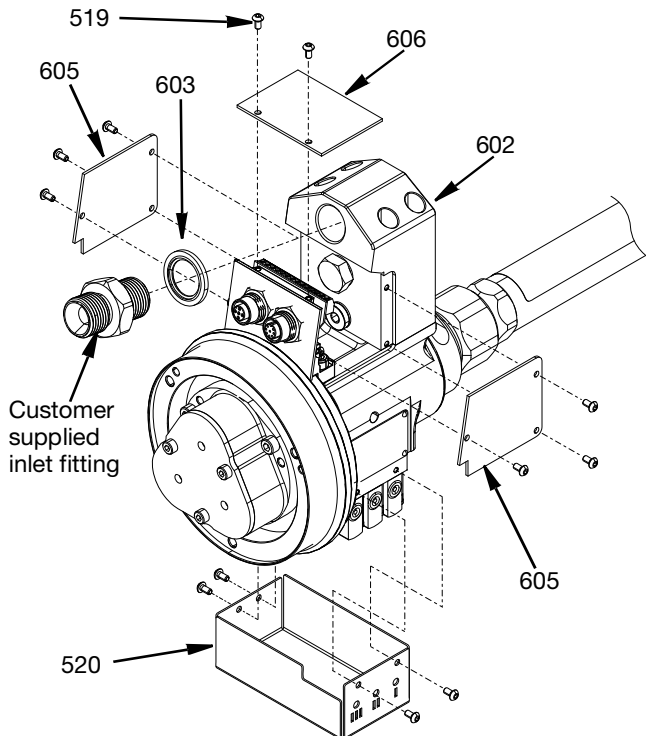


FIG. 39

## Testing Before Installation

If the SST Switch 3D Gun has been assembled after a major repair or maintenance operation, it is recommended to perform a function test before the SST Switch 3D Gun is returned to production.

A minimum level of function test is to connect the compressed air supply and check for air leakage by opening each of the solenoid valves (613) manually.

The cable connections can be checked using an Ohm-meter to test the connections from the plug to the terminals and to make sure that there are no short-circuits.

<p>If the SST Switch 3D Gun is tested offline with material pressure applied, to avoid skin injection always keep clear of the nozzles when test spraying.</p>				

Make a last check on all assembly screws and then follow the **Installation** instructions on page 8 to mount the SST Switch 3D Gun on the robot.

# Parts

## Parts Key

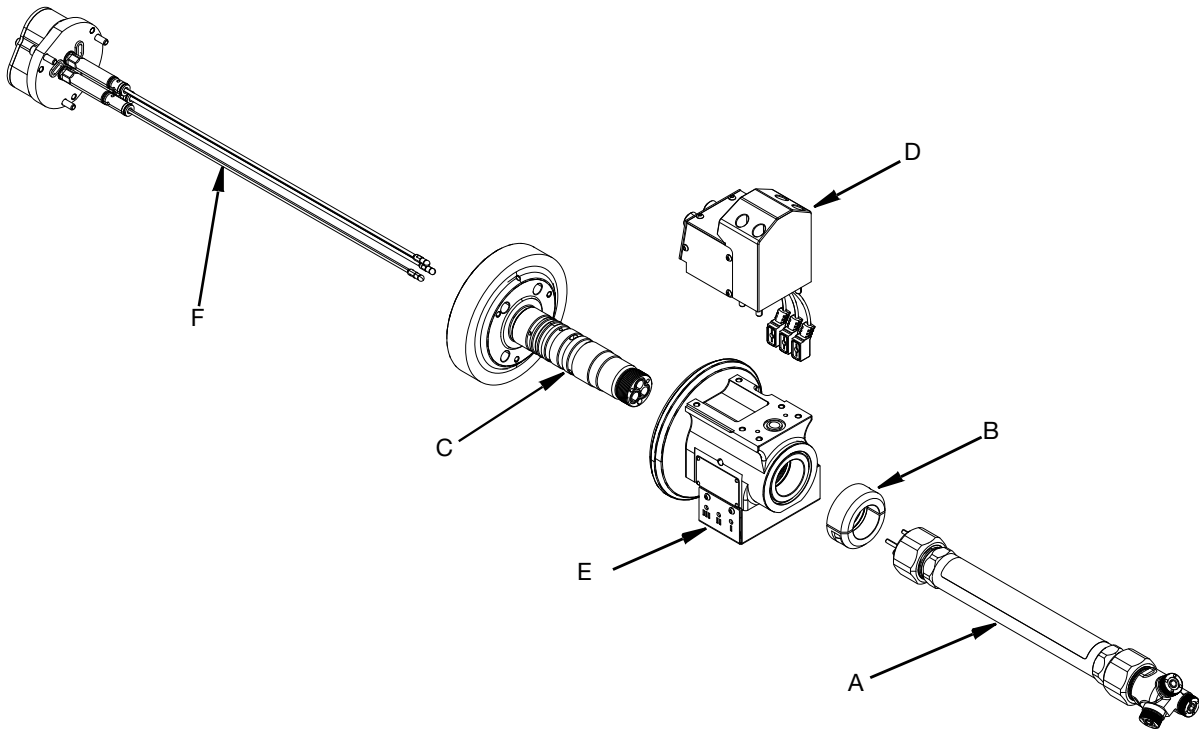
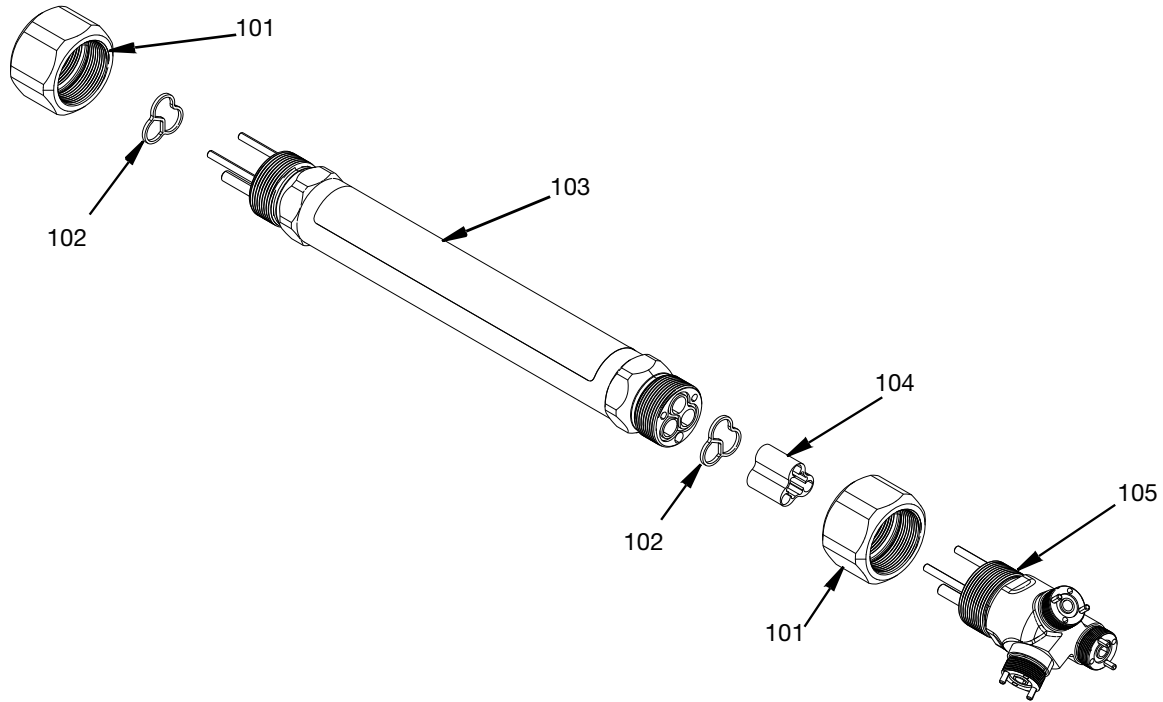


FIG. 40

**Key:**

- A. Nozzle Head and Material Tube Assembly page No. 28
- B. Lock Ring Assembly page No. 29
- C Central 3D Body page No. 29
- D.Connection Housing page No. 32
- E. Swivel Chamber page No. 31
- F. Modular Air Cylinder Assembly 25U924 page No. 30

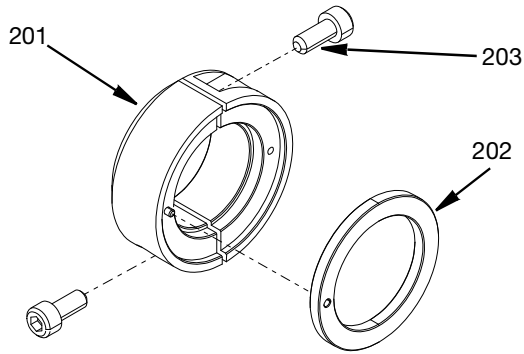
## Nozzle Head and Material Tube Assembly



### Nozzle Head and Material Tube Assembly Parts List.

Ref.	Part	Description	Model Number					
			25T991	25T992	25T993	25T994	25T995	25T996
101	15N245	NUT, turnbuckle, locking	2	2	2	2	2	2
102	17V839	GASKET, adapter	2	2	2	2	2	2
103	25U248	TUBE, 3D long, assembly	1	1	1	1	1	1
104	15N117	BEARING, valve shut off	1	1	1	1	1	1
105	25T942	ADAPTER, 3 head, assy, 0,45,75	1	1	1			
	25T990	ADAPTER, 3 head, assy, 0,45,90				1	1	1

## Lock Ring Assembly

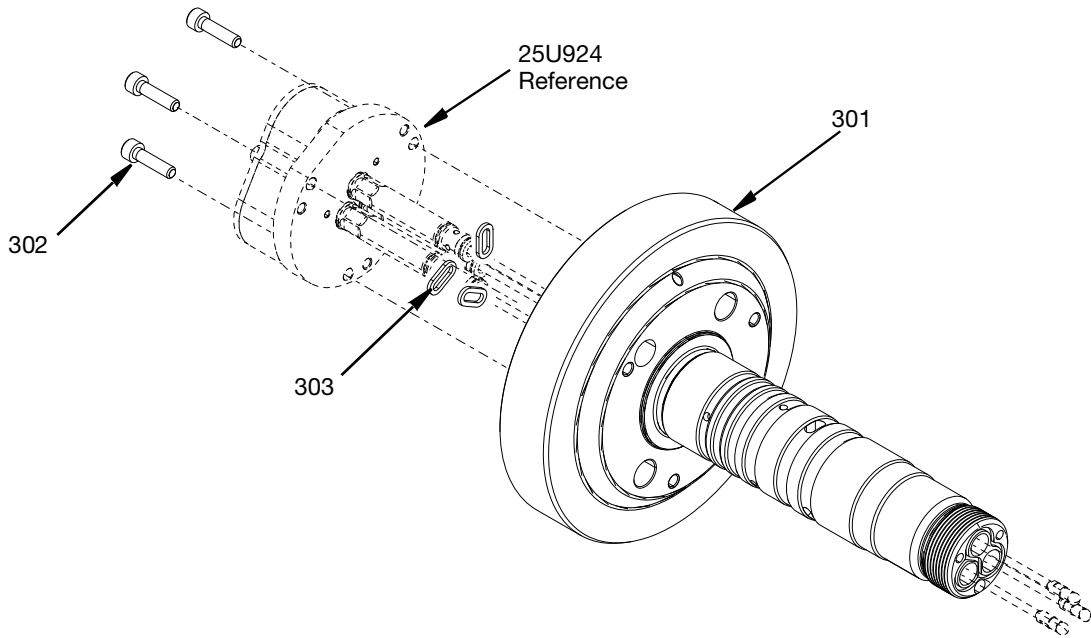


## Lock Ring Parts List

Ref.	Part	Description	Qty.
201*	17V910	RING, lock assembly	1
202	17V817	WASHER	1
203	117026	SCREW, M5x12, SHCS	2

\* Assembly 17V910 includes parts 17V817 and 117026.

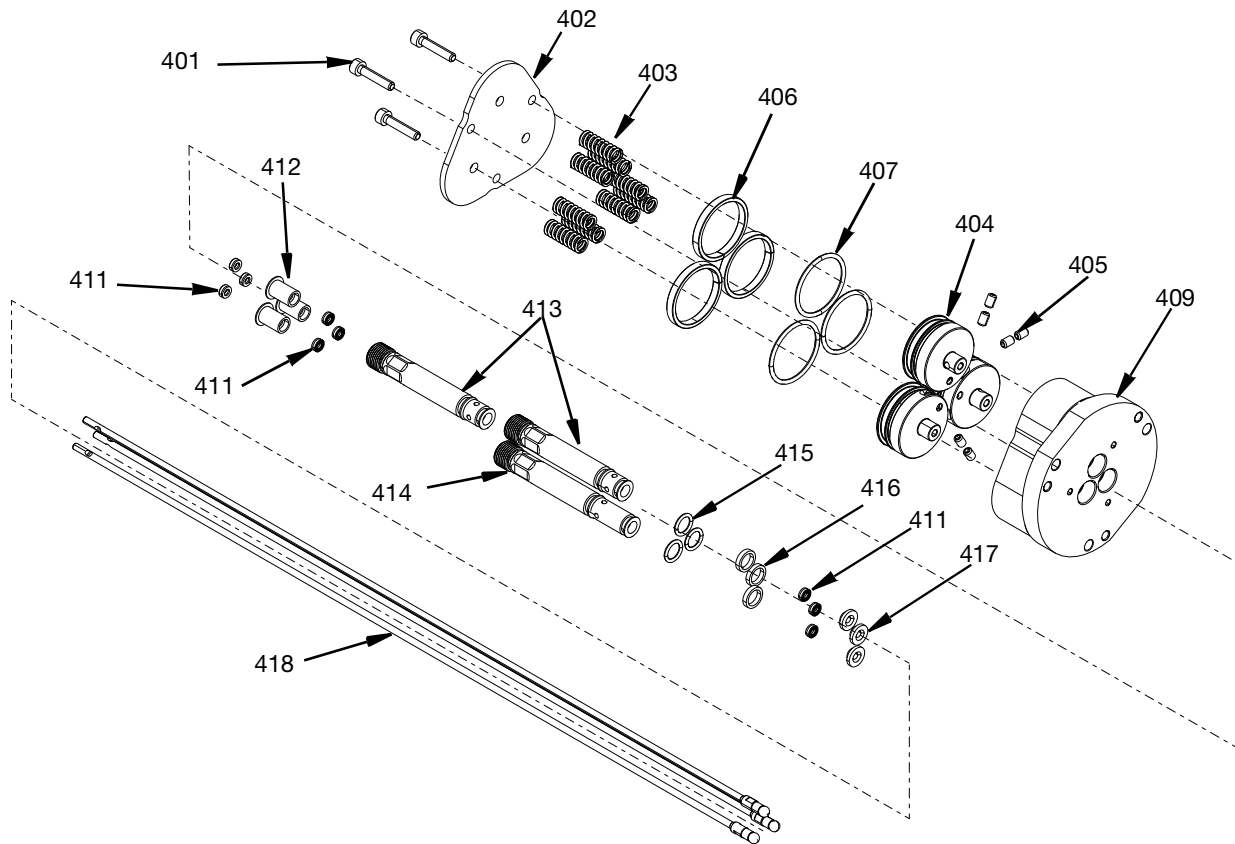
## Central 3D Body



## Central Body List

Ref.	Part	Description	Qty.
301	15N233	BODY, center, 3D	1
302	108326	SCREW. M5x20	3
303	15N283	GASKET, air	3

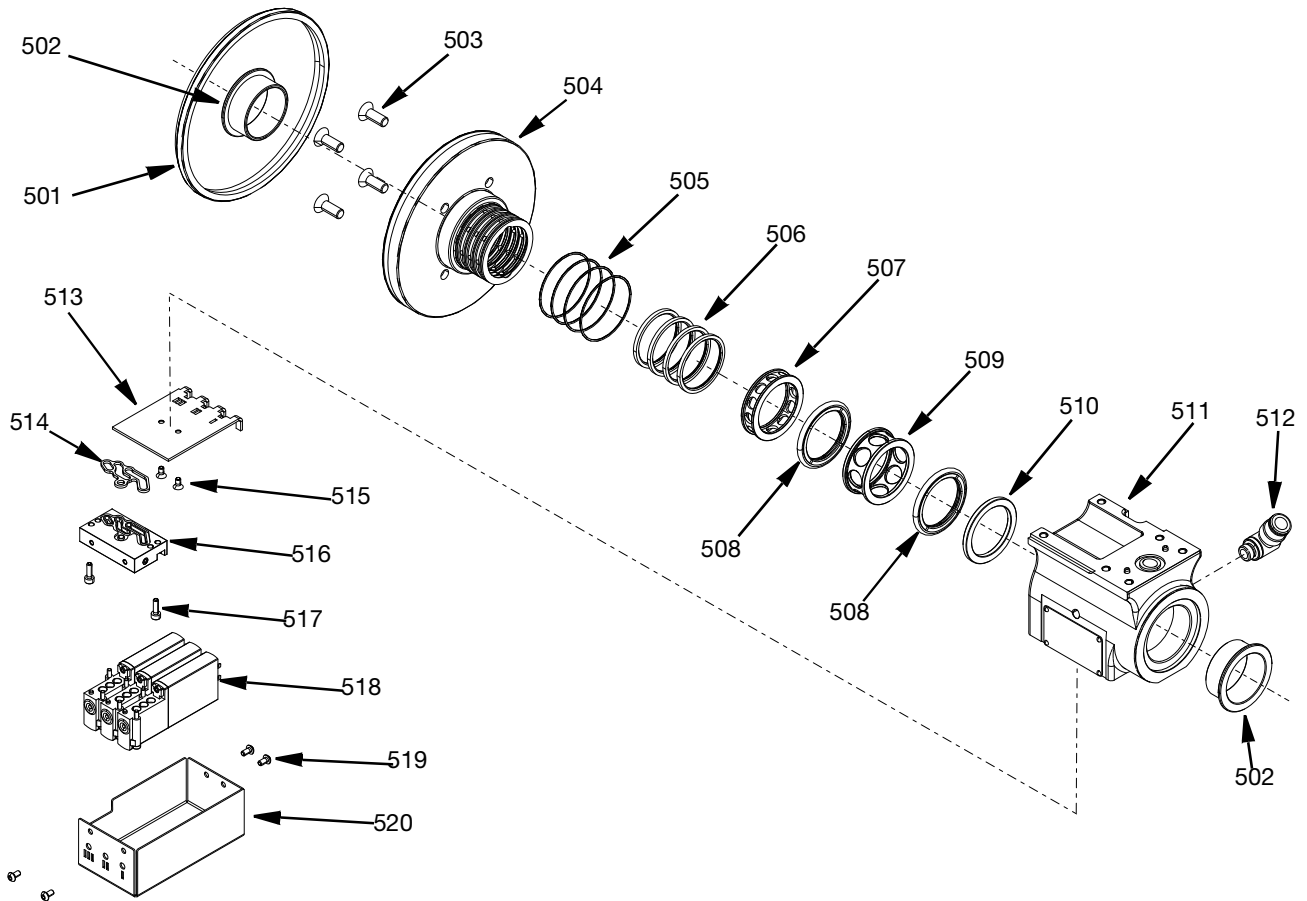
## Modular Air Cylinder Assembly 25U924



### Modular Air Cylinder Assembly 25U924 Parts List

Ref.	Part	Description	Qty.
401	116474	SCREW, SHCS, M4x20	3
402	15N539	CAP, valve, air cylinder	1
403	133950	SPRING	9
404	15N537	PISTON	3
405	105672	SCREW, set, shc	6
406	17V832	RING, guide	3
407	17V812	O-RING	3
409	25U247	HOUSING, air cylinder	1
411	17V813	PACKING, needle	9
412	15N249	BEARING, upper	3
413	15N251	GUIDE, seal, bearing, short	2
414	15N252	GUIDE, seal bearing, long	1
415	556554	O-RING, -011 viton-A 75 duro	3
416	2000132	SEAL, split ring	3
417	15N250	BEARING, lower	3
418	26D872	NEEDLE, ball shut off	3

# Swivel Chamber

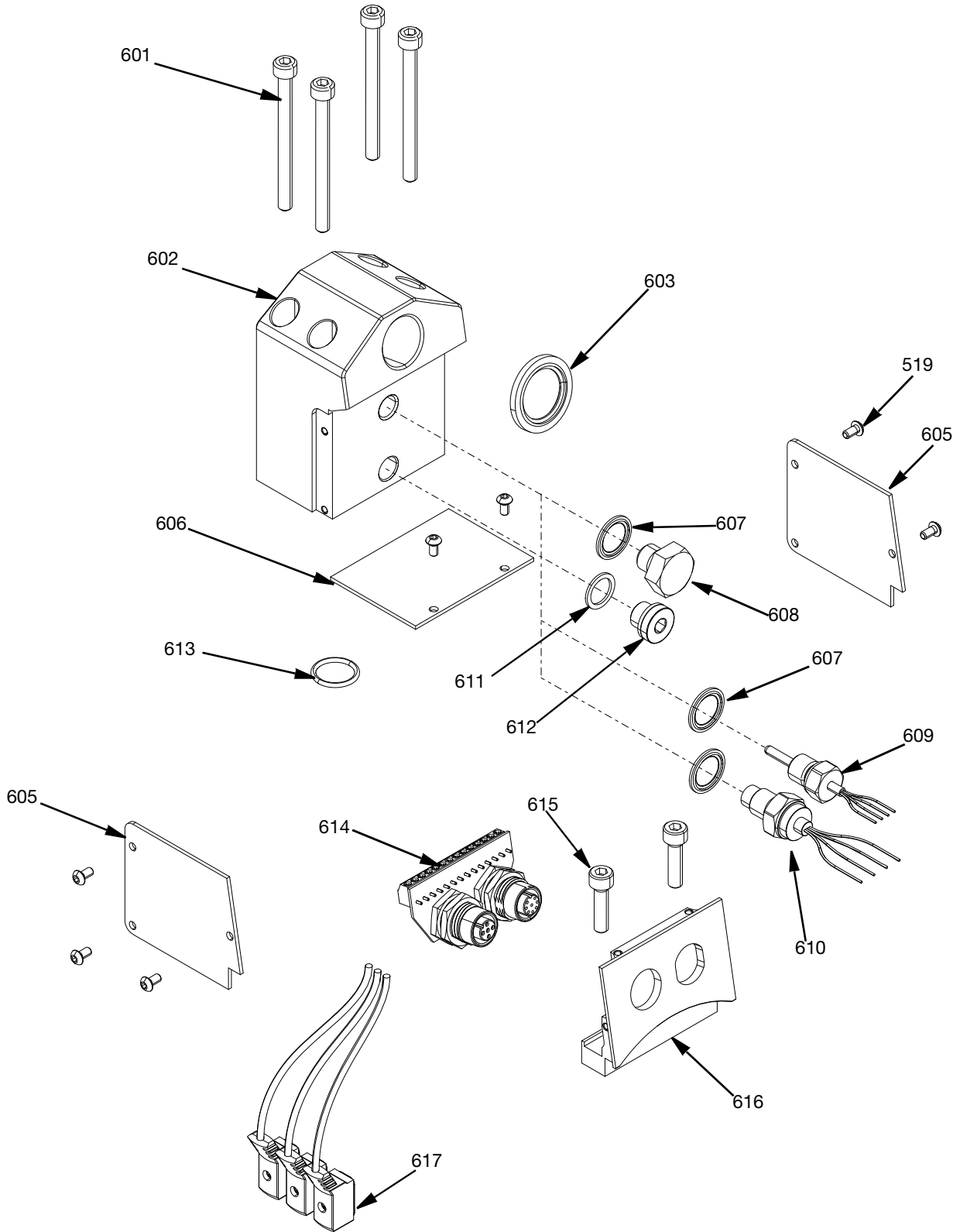


## Central Body Assembly Parts List

Ref.	Part	Description	Qty.
501	17V893	RING, dust, seal	1
502	17V828	BEARING, flange	2
503	133492	SCREW, mach, flathd, socket, M6x16	4
504	25U245	RING, air distribution, bearing	1
505	17V821	O-RING	4
506	17V855	SEAL, air	4
507	17V825	RING, distributor, weepage	1
508	17V895	SEAL, rotary	2
509	15N116	RING, distributor, material	1
510	17V827	RING, support	1
511	15N113	HOUSING, swivel, assy	1
512	17V816	FITTING, elbow, swvl, 1/8 BSPP, 8mm	1
513	17V889	COVER, inner	1

Ref.	Part	Description	Qty.
514	15N268	GASKET, air	1
515	132555	SCREW, M3x0.5x6, flathead, CS, zinc	2
516	25U246	MANIFOLD, air, valve	1
517	125609	FASTNER, screw, SHCS, M3x0.5x10, SS	2
518	17V890	VALVE, solenoid, 3/2	3
519	132559	SCREW, BHCS, M3x6, hex drive	12
520	17V888	COVER, outer, blue	1

# Connection Housing





## Connection Housing Parts List

Ref.	Part	Description	Quantity Per Model Number					
			25T991	25T992	25T993	25T994	25T995	25T996
601	125386	SCREW, SHCS, M5x60	4	4	4	4	4	4
602	25U337	ADAPTER, inlet, single, SST	1	1	1	1	1	1
603	133162	SEAL, washer, 1/2 in. BSPP, SST	1	1	1	1	1	1
519	132559	SCREW, BHCS, M3x6, hex drive	8	8	8	8	8	8
605	17U843	COVER, side, blue	2	2	2	2	2	2
606	17V844	COVER, top, blue	1	1	1	1	1	1
607	17V808	SEAL, washer, 10MM	1	1	2	1	1	2
608	17V795	SCREW, hex head cap, M10x12,SST	1			1		
609	18C869	SENSOR, RTD		1	1		1	1
610	18C870	TRANSDUCER, pressure,.5-4.5V,350B			1			1
611	17V807	WASHER,10/14x1, copper	1	1		1	1	
612	17V815	PLUG, M10x1,SST	1	1		1	1	
613	115719	PACKING,O-Ring, 015,viton	1	1	1	1	1	1
614	15N126	CONNECTOR, dual cable	1	1	1	1	1	1
615	120885	SCREW, SHCS, M5	2	2	2	2	2	2
616	15N115	BRACKET, connector, dual	1	1	1	1	1	1
617	17V891	CABLE, connection, solenoid valve	3	3	3	3	3	3

# Kits and Tools

## LASD Nozzle Assembly Kits 25U016 and 25U017

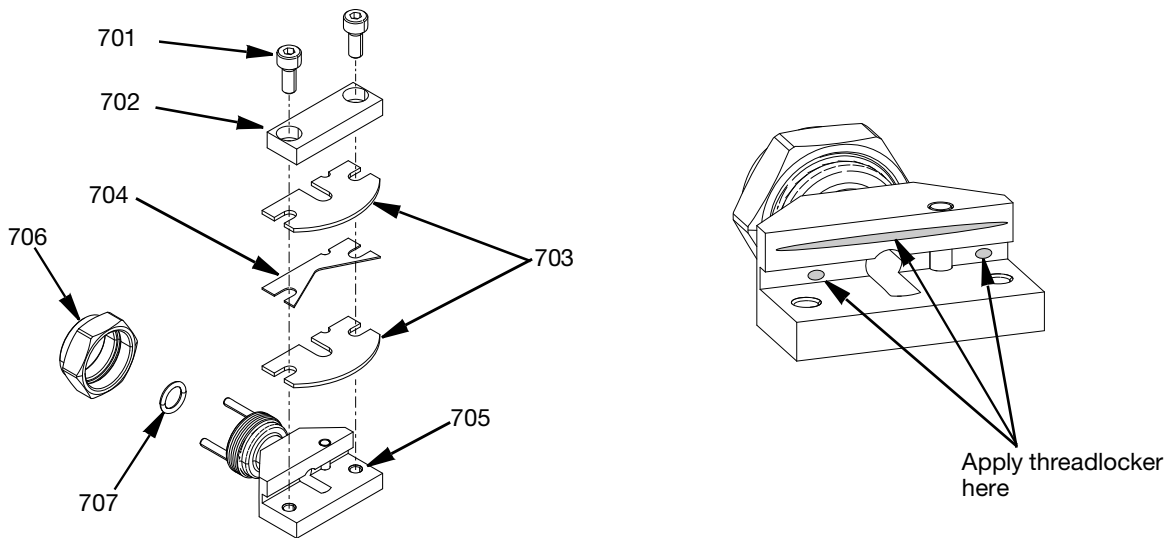


FIG. 41

### LASD Nozzle Parts List 25U016 and 25U017

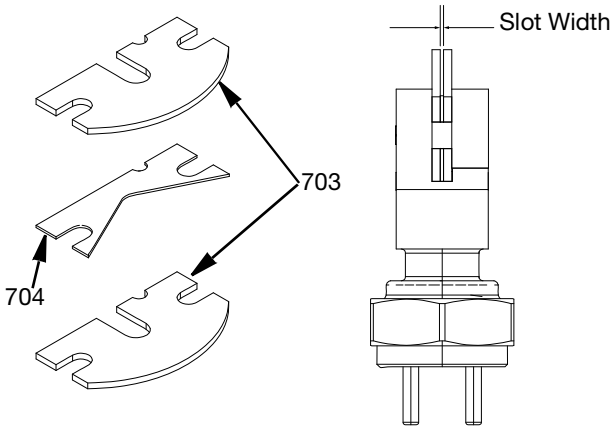
Ref.	Part	Description	25U016	25U017
701	131805	SCREW, SHC, M4-0.7x10 SS	2	2
702	15N123	CLAMP	1	1
703	15N118	PLATE, outer, nozzle, 0.5mm,WC		2
	15N120	PLATE,outer, nozzle, 0.4mm,WC	2	
704	15N119	SPACER, nozzle, 0.5mm, WC		1
	15N121	SPACER, nozzle, 0.4mm, WC	1	
705	25U015	HOUSING, nozzle	1	1
706	15N124	NUT, turnbuckle	1	1
707	133267	O-RING,7MM ID X 1.5MM TH,FKM,75A	1	1

**NOTE:** Part number 25U016 uses LASD Nozzle Plate Assembly Kit 25U331. Part number 25U017 uses LASD Nozzle Plate Assembly kit 25U332.

### LASD Nozzle Kit Assembly

1. Follow the **Pressure Relief Procedure** on page 12 before removing or replacing nozzles.
1. Place Nozzle spacer (704) between two WC outer nozzle plates (703) and line up the notches in the parts.
1. Apply Blue, Medium strength thread locker used for this assembly is Loctite<sup>®</sup> 242 or equivalent to the surface shown in FIG. 41.
2. Place sandwiched pieces against the step of the housing nozzle (705) lining up the notches with the locating pin in the housing nozzle.
3. Place the clamp (702) with the fluid passage notch facing the fluid passageway and tighten down with two M4 SHC screws(701). Torque to 29.2 in-lb (3.3 N•m). See FIG. 41.

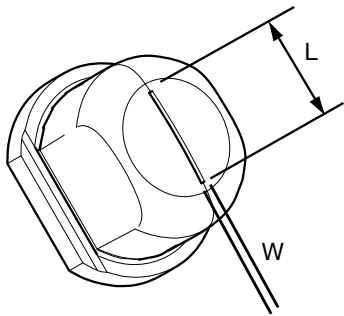
**LASD Nozzle Plates Assembly  
Kits 25U331 and 25U332**



**LASD Nozzle Plates Assembly Kits 25U331  
and 25U332 Parts List**

Part Number	Description	Slot Width	15N118	15N119	15N120	15N121
25U331	Nozzle Assembly, 0.4mm	0.4mm	2	1		1
25U332	Nozzle Assembly, 0.5mm	0.5mm			2	1

**Spray Stream Nozzle Kits**



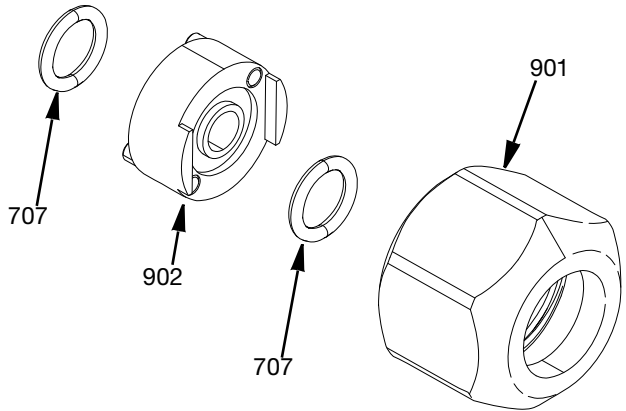
**Spray Stream Nozzle Parts List**

Ref.	Part	W in. (mm)	L in. (mm)
801	17V669	0.012 (0.30)	0.27 (7)
	17V670	0.012 (0.30)	0.31 (8)
	17V671	0.012 (0.30)	0.35 (9)
	17V672	0.012 (0.30)	0.39 (10)
	17V673	0.015 (0.38)	0.31 (8)
	17V674	0.015 (0.38)	0.35 (9)
	17V675	0.015 (0.38)	0.39 (10)
	17V676	0.015 (0.38)	0.43 (11)

**NOTE:** Kits include nozzle and O-ring.

**Spray Stream Adapter Kit,  
25U338**

101

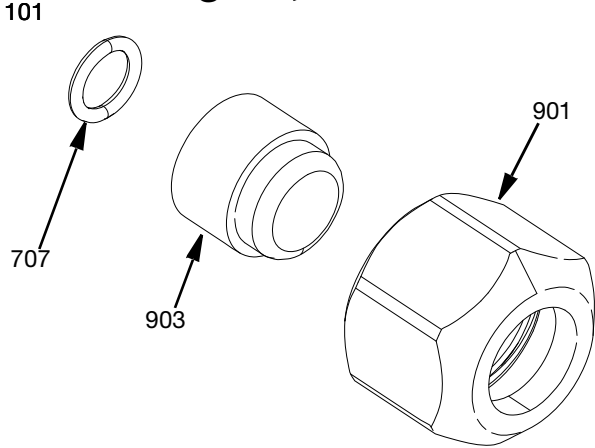


**NOTE:** Apply anti seize to retaining nut (901) threads before assembly.

**Spray Stream Adapter Kit Parts List,  
25U338**

Ref.	Part	Description	Qty.
901	15N229	NUT, retaining	1
902	25U305	ADAPTER, nozzle, sealer, spray, assembly	1
707	133267	O-RING, 7MM ID X 1.5MM TH, FKM, 75A	2

### Nozzle Plug Kit, 25U333

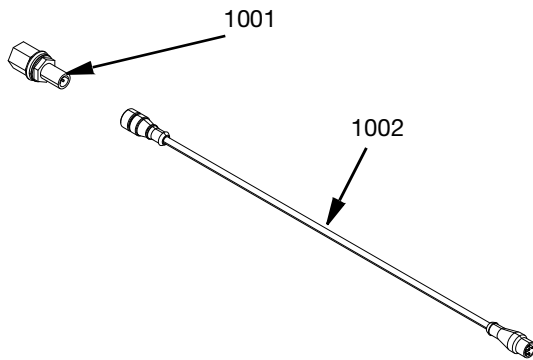


**NOTE:** Apply anti seize to retaining nut (901) threads before assembly.

#### Nozzle Plug Kit Parts List, 25U333

Ref.	Part	Description	Qty.
901	15N229	NUT, retaining	1
903	15N318	PLUG, nozzle	1
707	133267	O-RING, 7MM ID X 1.5MM TH,FKM,75A	1

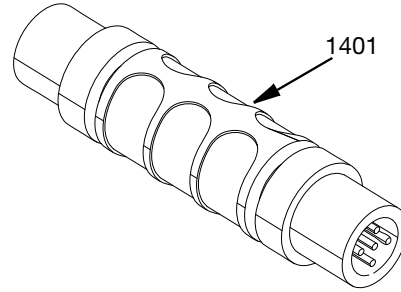
### PCF to 3D Gun Cable Kit 25U441



#### PCF to 3D Gun Cable Kit Parts List

Ref.	Part	Description	Qty.
1001	121612	CONNECTOR, thru, M12, MXF,	1
1002	25U014	CABLE, GCA, M12 5P, M/F. ).5M LG	1

### Male to Male M12 Connector Kit, 15N436

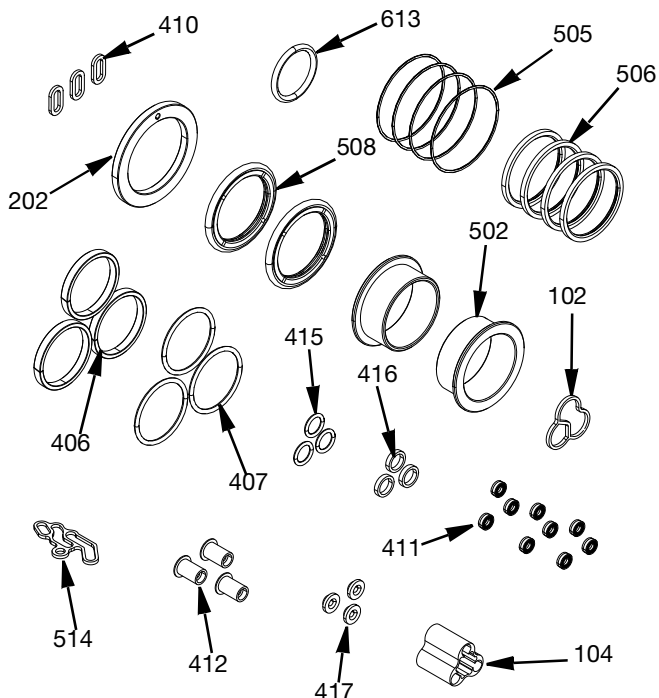


**NOTE:** Use this connector kit when the robot cable has a female connector that needs to match the SST Switch 3D Gun female connector.

#### Male to Male M12 Connector Kit Parts List, 15N436

Ref.	Part	Description	Qty.
1401	15N436	CONNECTOR, M12 5P, male to male	1

## Yearly Service Kit, 25U328

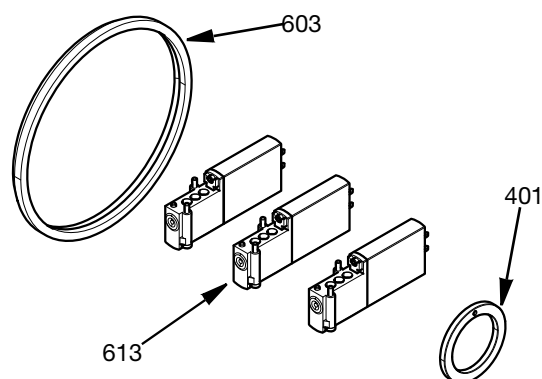


### Service Kit Parts List, 25U328

Ref.	Part	Description	Qty.
102	17V839	GASKET, adapter	1
104	15N117	BEARING, valve shut off	1
202	17V817	WASHER	1
406	17V832	RING, guide	3
407	17V812	O-RING	3
410	15N283	GASKET, air	3
411	17V813	PACKING, needle	9
412	15N249	BEARING, upper	3
415	556554	O-RING, -011 viton-A 75 duro	3
416	2000132	SEAL, split ring	3
417	15N250	BEARING, lower	3
502	17V828	BEARING, flange	2
505	17V821	O-RING	4
506	17V855	SEAL, air	4
508	17V895	SEAL, rotary	2
514	15N268	GASKET, air	1
613	115719	PACKING,O-Ring, 015,viton	1

**NOTE:** Service Kit 25U328 is provided for preventive maintenance done on the SST Switch 3D Gun once a year based on average usage.

## Service Kit, 25T485

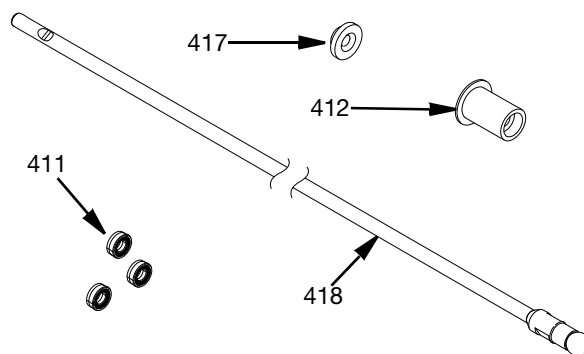


### Service Kit Parts List, 25T485

Ref.	Part	Description	Qty.
401	17V817	WASHER, lock ring	1
613	17V890	VALVE, solenoid	3
603	17V893	RING, dust seal	1

**NOTE:** Service Kit 25t485 is provided for preventive maintenance done on the SST Switch 3D Gun once every two years based on average usage.

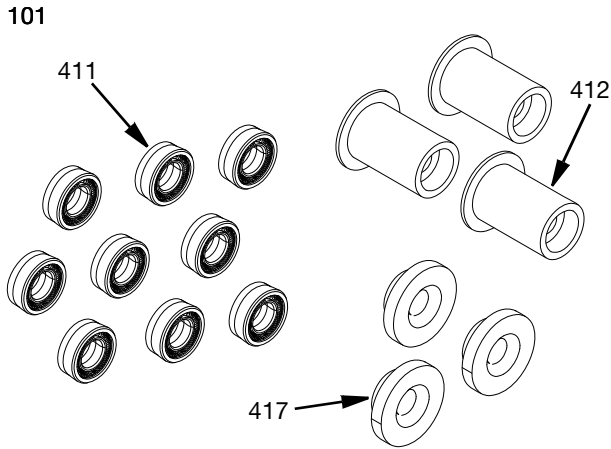
## Ball Shut Off Needle Kit, 25U330



### Ball Shut Off Needle Service Kit Parts List, 25U330

Ref.	Part	Description	Qty.
411	17V813	PACKING, needle	3
412	15N249	BEARING, upper	1
417	15N250	BEARING, lower	1
418	26D872	NEEDLE, ball shut off	1

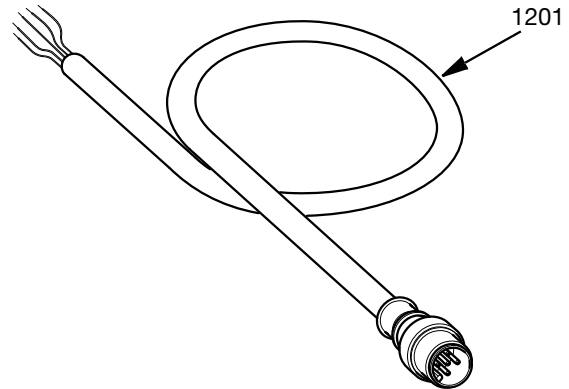
### Bearing and Seals Kit, 25U329



#### Bearing and Seals Kit Parts List, 25U329

Ref.	Part	Description	Qty.
411	17V813	PACKING, needle	9
412	15N249	BEARING, upper	3
417	15N250	BEARING, lower	3

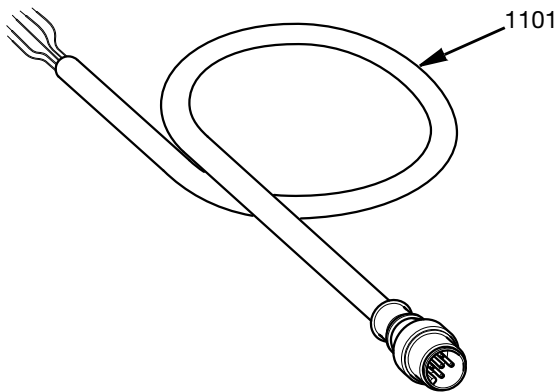
### 8 Pin Cable Kit, 15N265



#### 8 Pin Cable Kit Part List, 15N265

Ref.	Part	Description	Qty.
1201	15N265	CABLE, M12, 8 pin	1

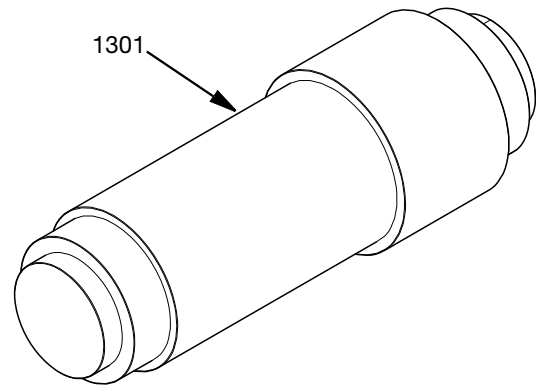
### 5 Pin Cable Kit, 17V857



#### 5 Pin Cable Kit Part List, 17V857

Ref.	Part	Description	Qty.
1101	17V857	CABLE, M12, 5 pin	1

### Material Seal Insertion/Removal Tool, 17V972



#### Material Seal Insertion/Removal Tool Part List, 17V972

Ref.	Part	Description	Qty.
1301	17V972	TOOL, mounting	1

# Performance Charts

## Pattern Width Versus Spray Stream Style Nozzle Sizes

The following tests were performed using a typical PVC seam sealer. See FIG. 42.

- 600,000 centipose
- Specific gravity 0.82

The graph below shows a fixed flow rate of 9.4 cc / sec and a fixed robot speed of 300 mm / sec.

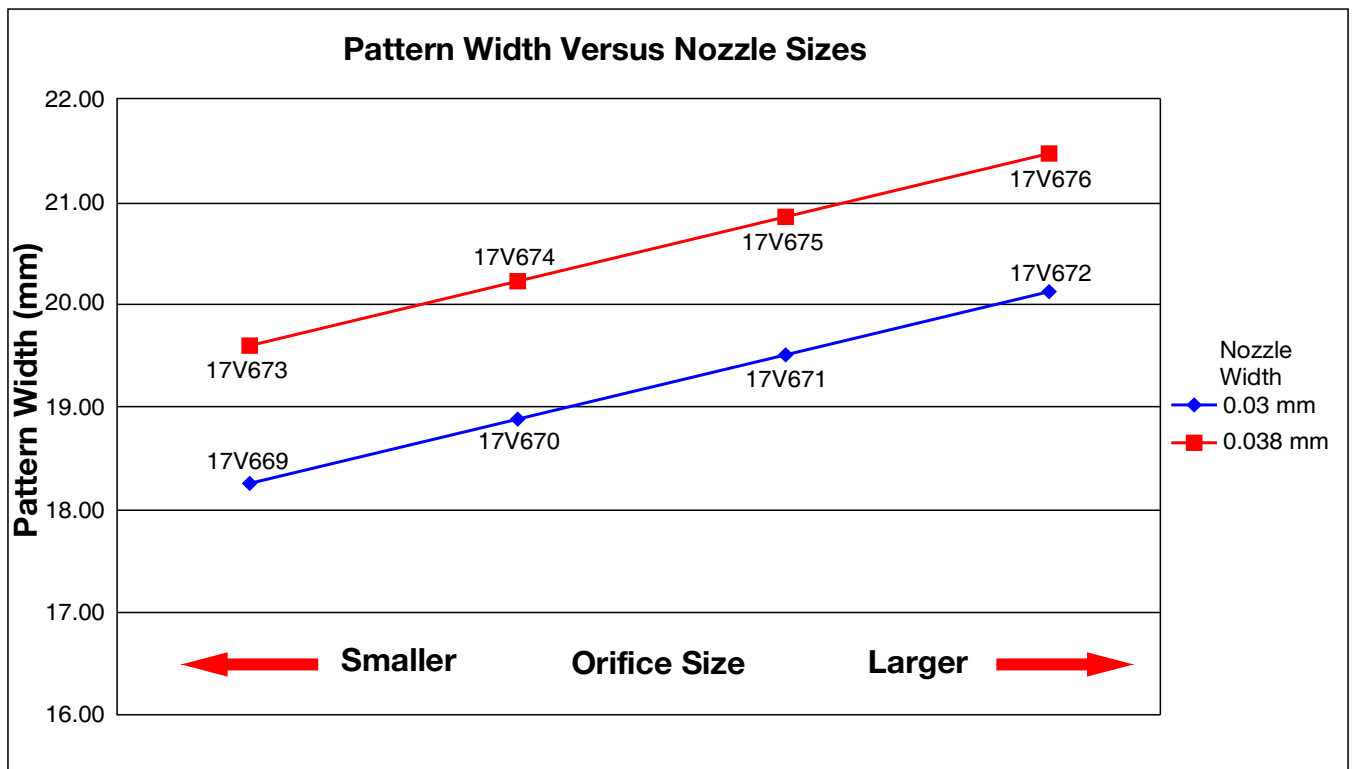


FIG. 42

## Material Pressure Versus Spray Stream Style Nozzle Sizes

The graph below represents the pressures for each tip to achieve the width shown in the **Pattern Width Versus Spray Stream Style Nozzle Sizes** graph. See FIG. 42. Pressure data may be useful when choosing a tip size due to the pressure limitation of the metering equipment. See FIG. 43.

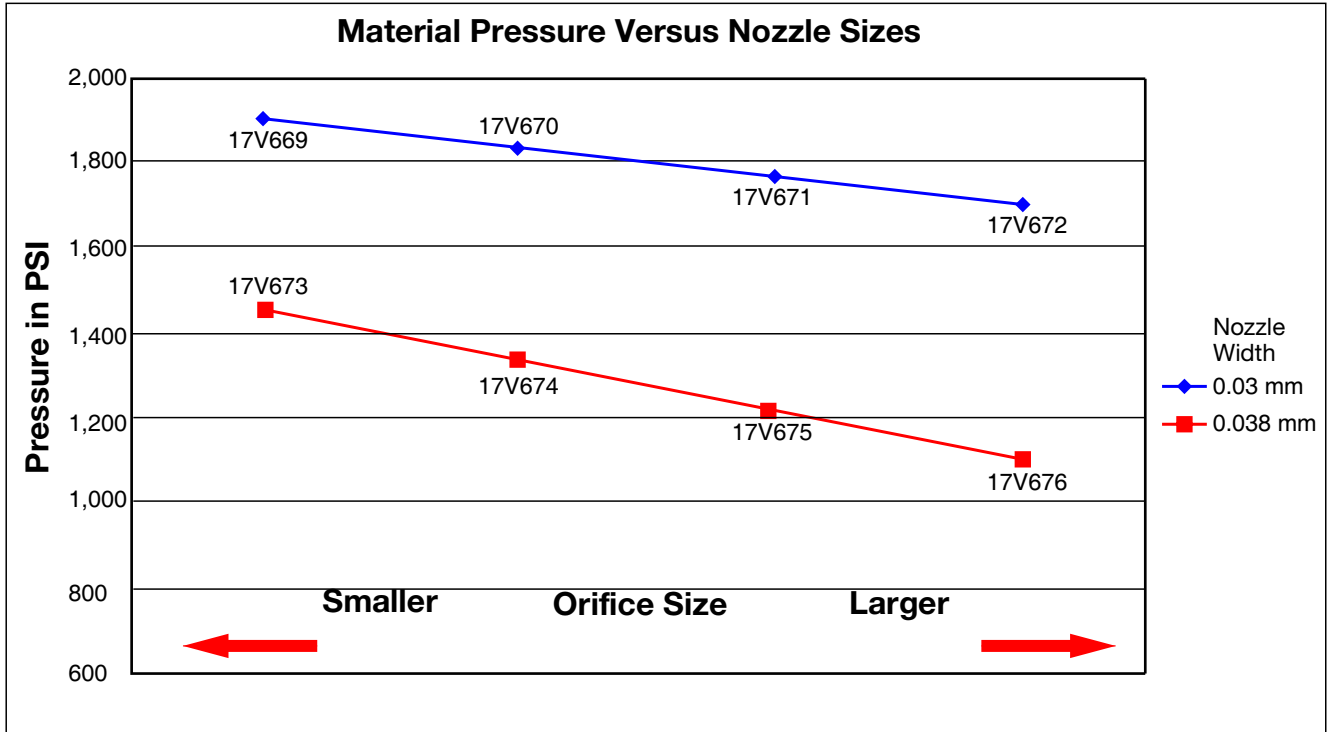


FIG. 43



# Pattern Height / Width Versus cc/sec for Spray Stream Style Nozzles

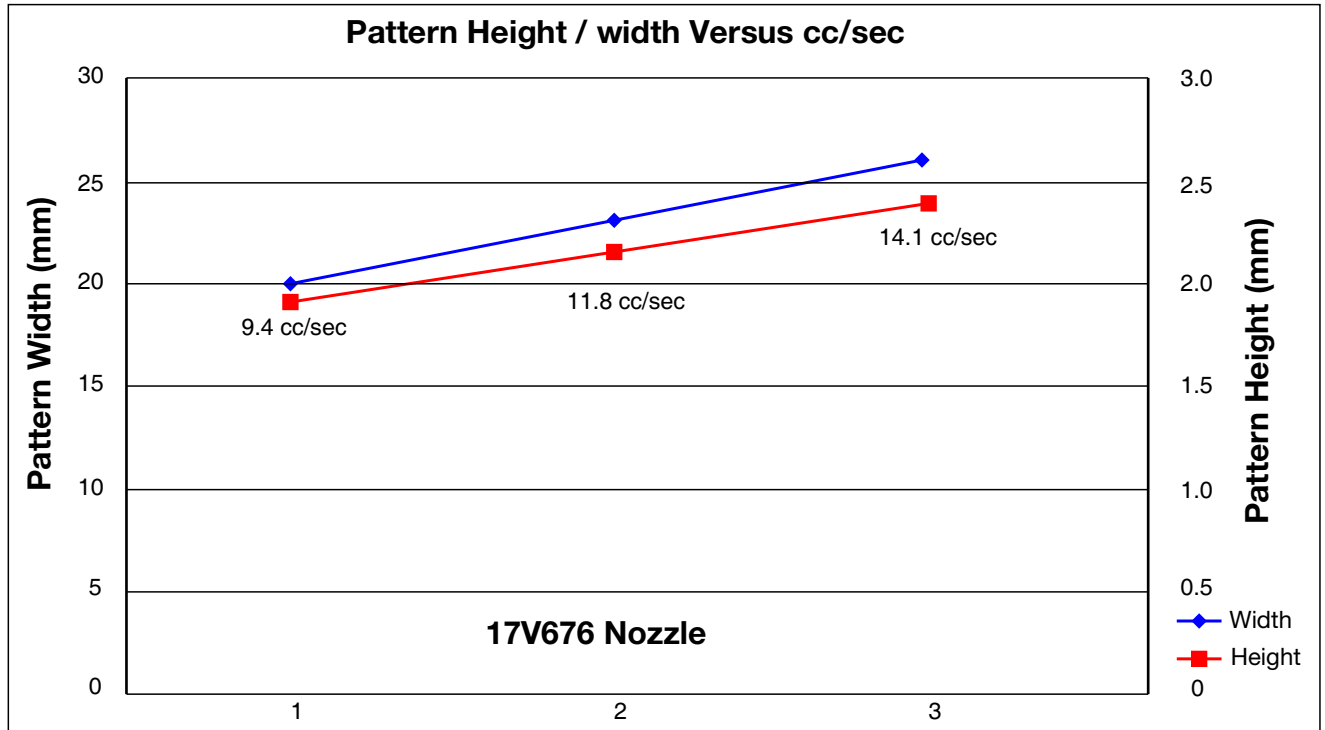


FIG. 44

## Bead Pattern Spray Stream Style Nozzle

Distance from the target affects the quality of the boundary layer between the sealer and the metal surface. Excessive distance can trap air in-between the bead and the metal surface, which could result in moisture penetrating between the layers. See FIG. 45\*\*

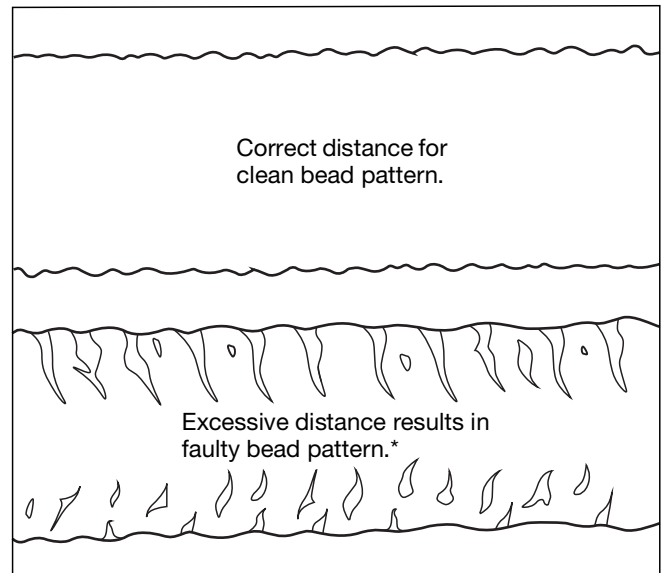


FIG. 45

\* Your results may vary.

\*\* Heat curing may reduce this effect

# Pattern Thickness Versus flow Rate and Robot Speed for 0.50 mm LASD Nozzle, 25U016

NOTE: Typical robot speed is 300mm/sec. Bead Thickness is determined by robot speed.

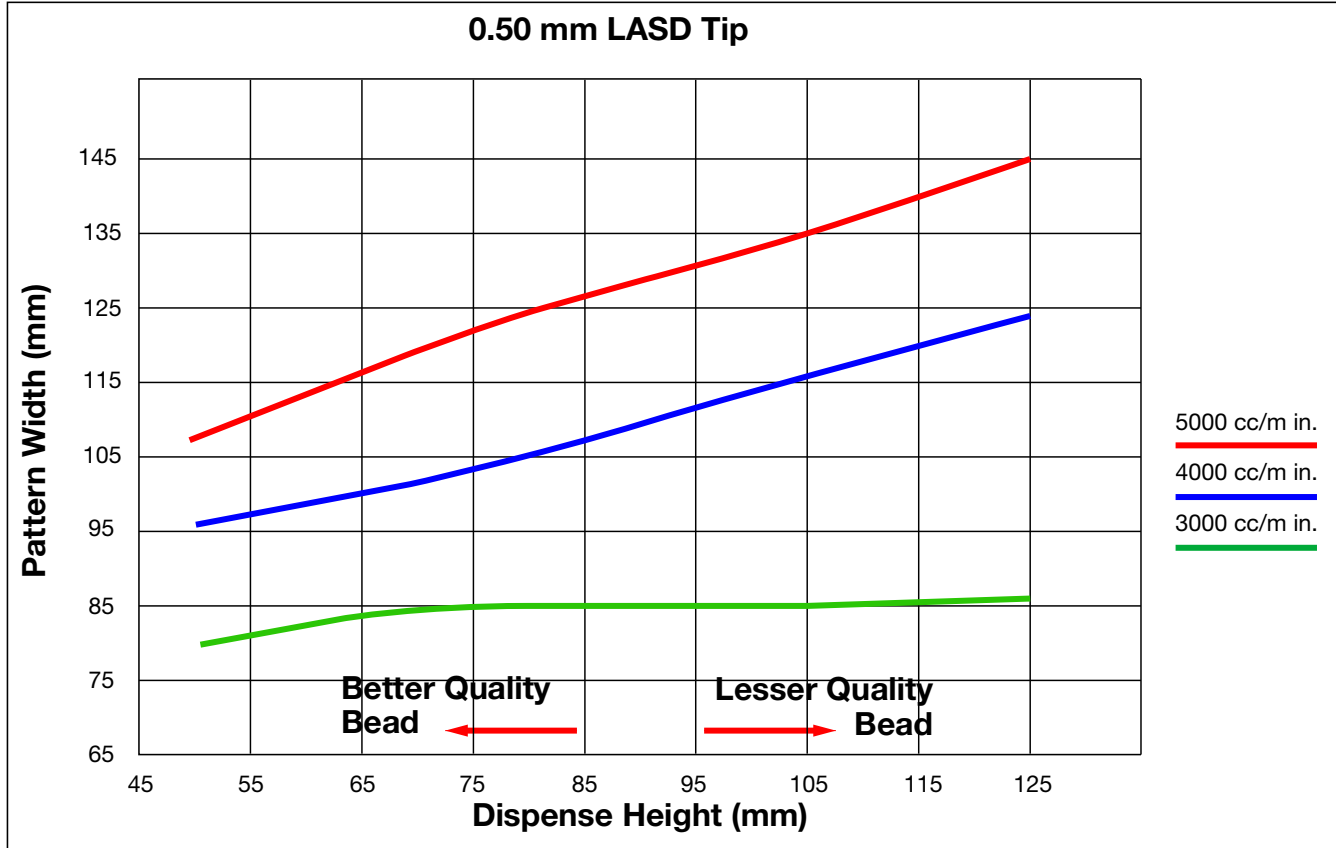


FIG. 46

# Pattern Thickness Versus flow Rate and Robot Speed for 0.40 mm LASD Nozzle, 25U017

NOTE: Typical robot speed is 300mm/sec. Bead Thickness is determined by robot speed.

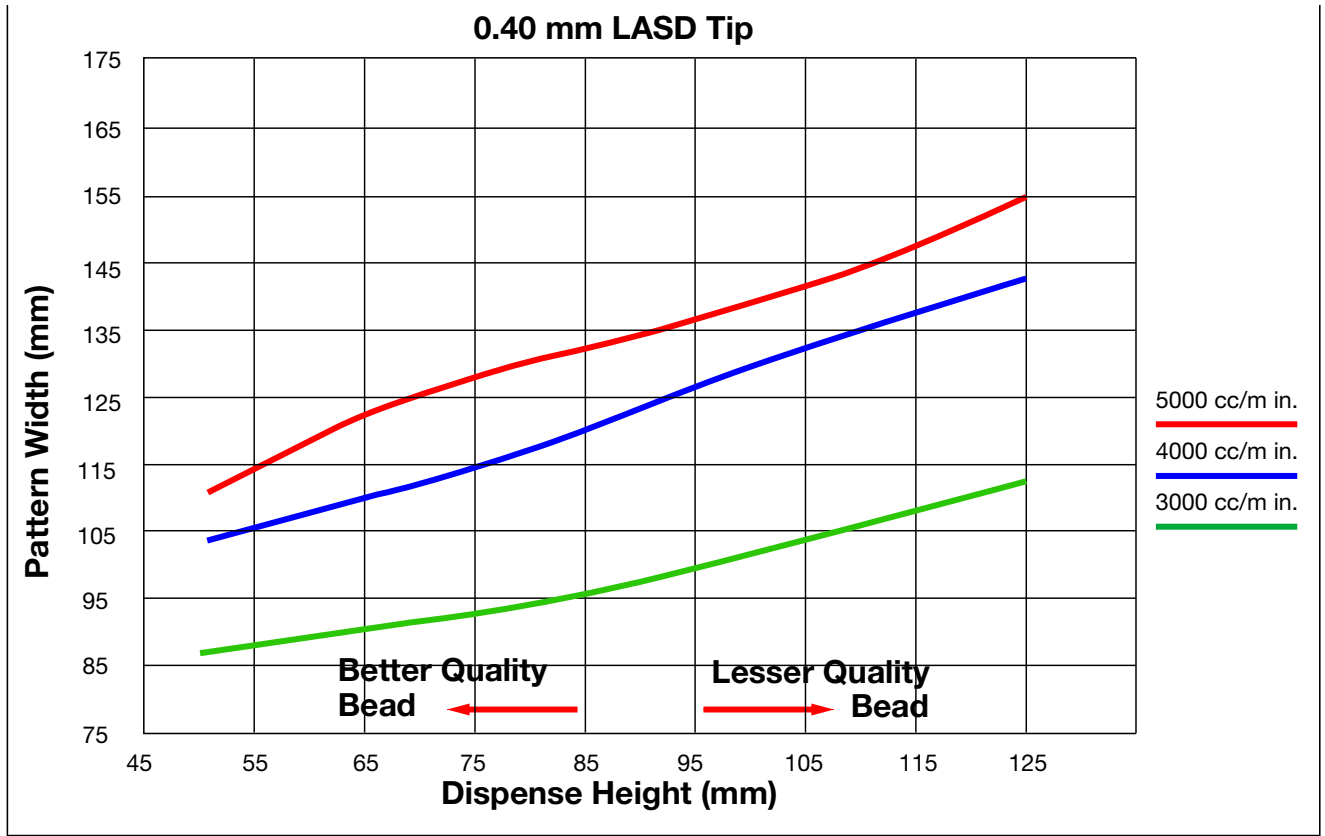


FIG. 47

## Spray Pattern LASD Nozzle

The width of the bead is consistent with the height above the surface. The thickness of the bead depends on the speed of the robot. See FIG. 48.

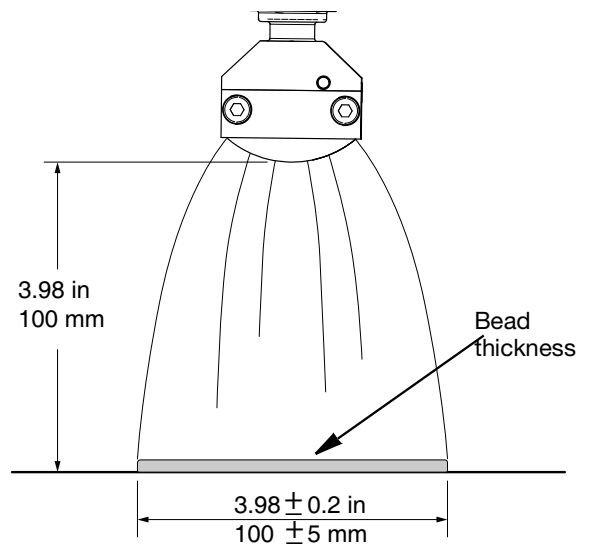
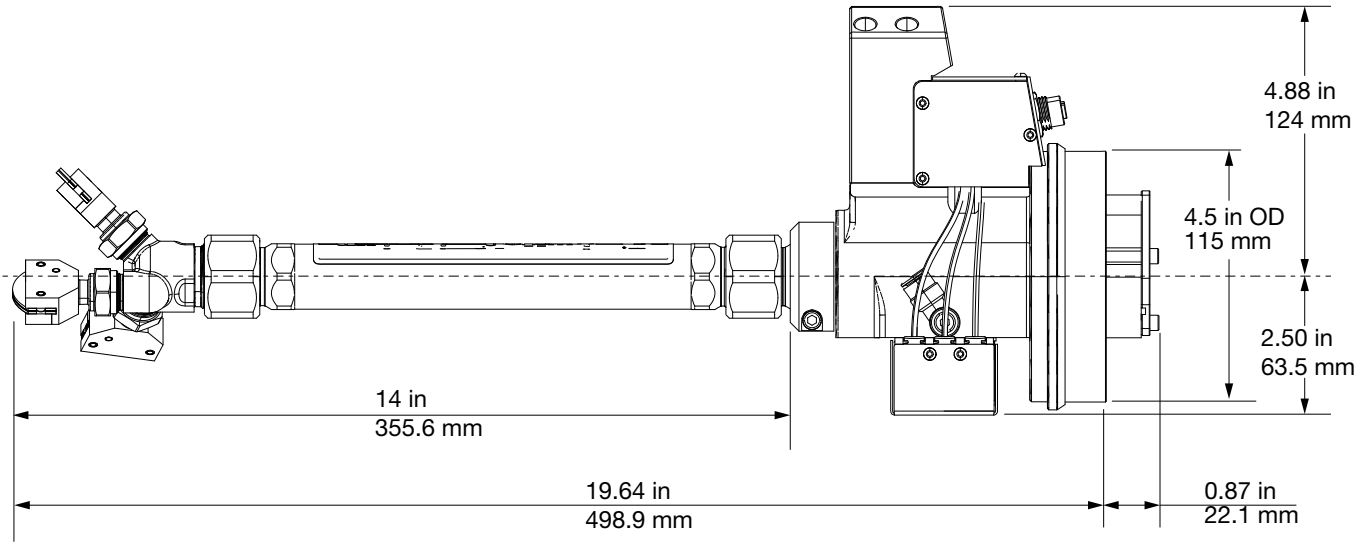
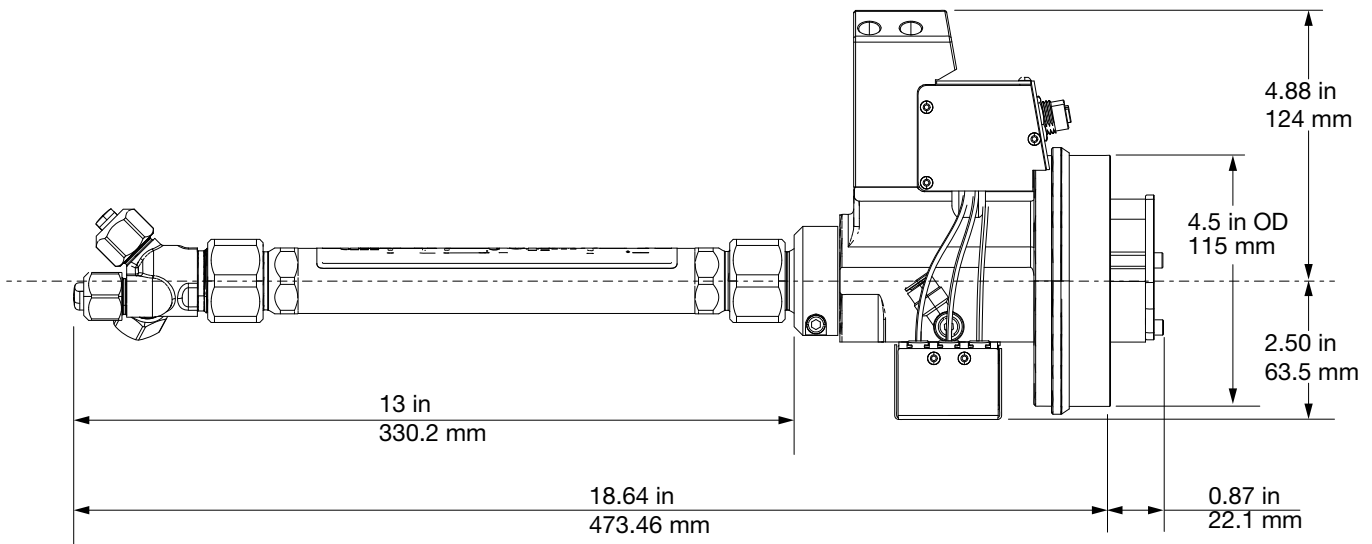


FIG. 48

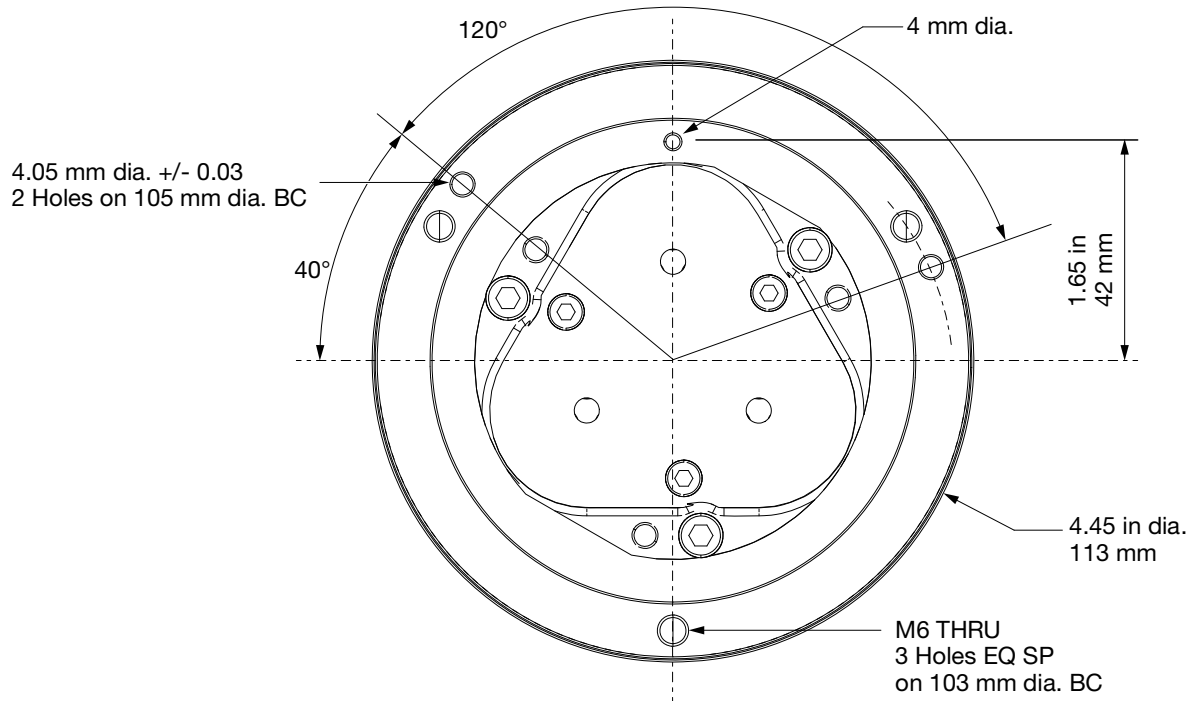
# Dimensions



**FIG. 49 Side View Typical for 25T991, 25T992, 25T993, 25T994, 25T995, 25T996 With LASD Nozzles**



**FIG. 50 Side View Typical for 25T991, 25T992, 25T993, 25T994, 25T995, 25T996 With Spray Stream Nozzles**



**FIG. 51 Robot Mounting Flange Typical for all SST Switch 3D Guns**

# Wiring Diagrams

## 5 Pin and 8 Pin Connector

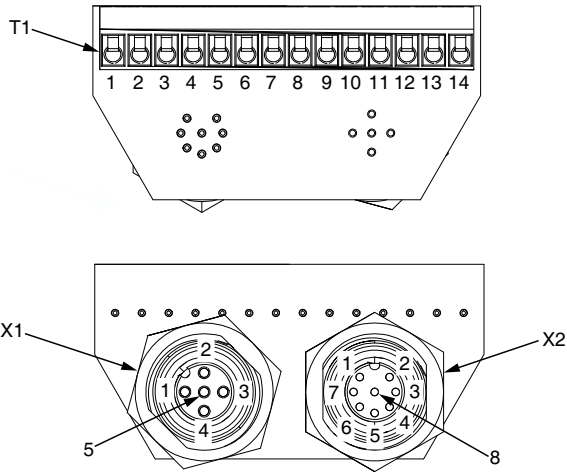
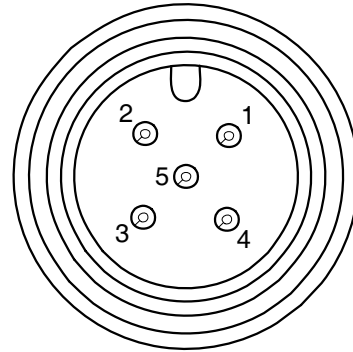


FIG. 52

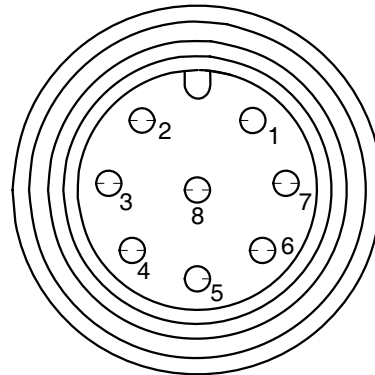
T1	X1	X2	Wire Color
1		6	Pink
2		4	Yellow
3		3	Green
4		2	Brown
5		8	Red
6		1	White
7		7	Blue
8		5	Grey
9	3		Blue
10	2		White
11	1		Brown
12	4		Black
13	4		Black
14	4		Black

## 5 Pin Cable Schematic



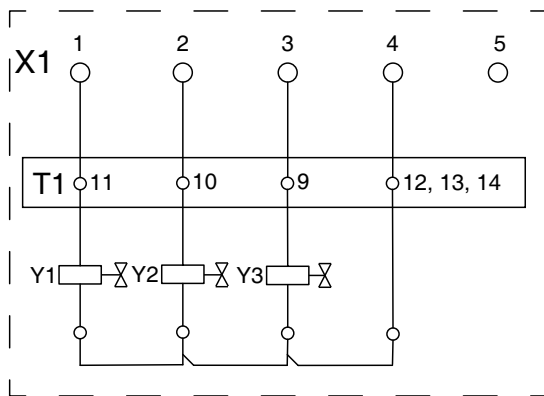
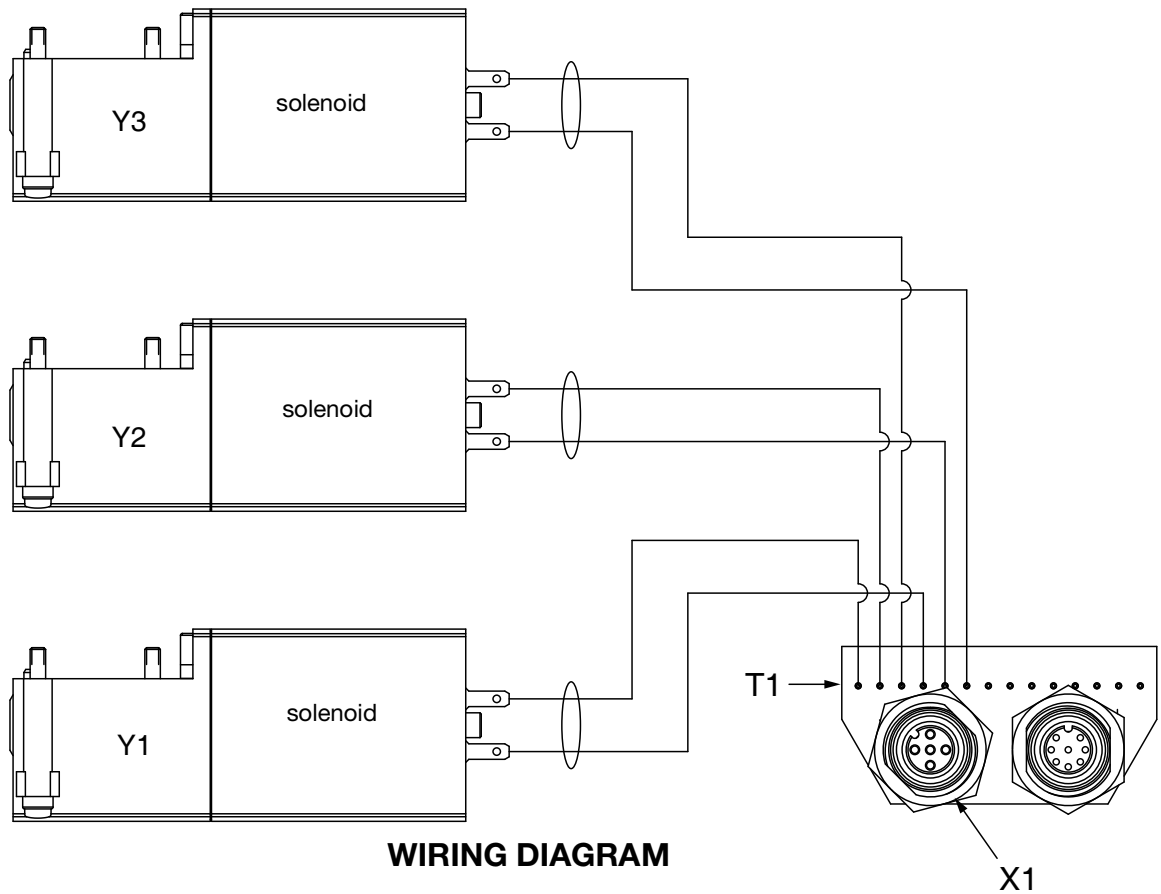
Pin No.	Wire Color
1	Brown
2	White
3	Blue
4	Black
5	Grey

## 8 Pin Cable Schematic



Pin No.	Wire Color
1	White
2	Brown
3	Green
4	Yellow
5	Grey
6	Pink
7	Blue
8	Red

### 5 Pin - No Sensor for 25T991 and 25T994



**SOLENOID WIRING SCHEMATIC**

**Fig. 53 Schematic for 25T991 and 25T994**

**NOTE:** See **Electrical Components** page 51 for specifications.

## 5 Pin and 8 Pin Connections for Temperature and Pressure Sensors. Model No. 25T992, 25T993, 25T995 and 25T996

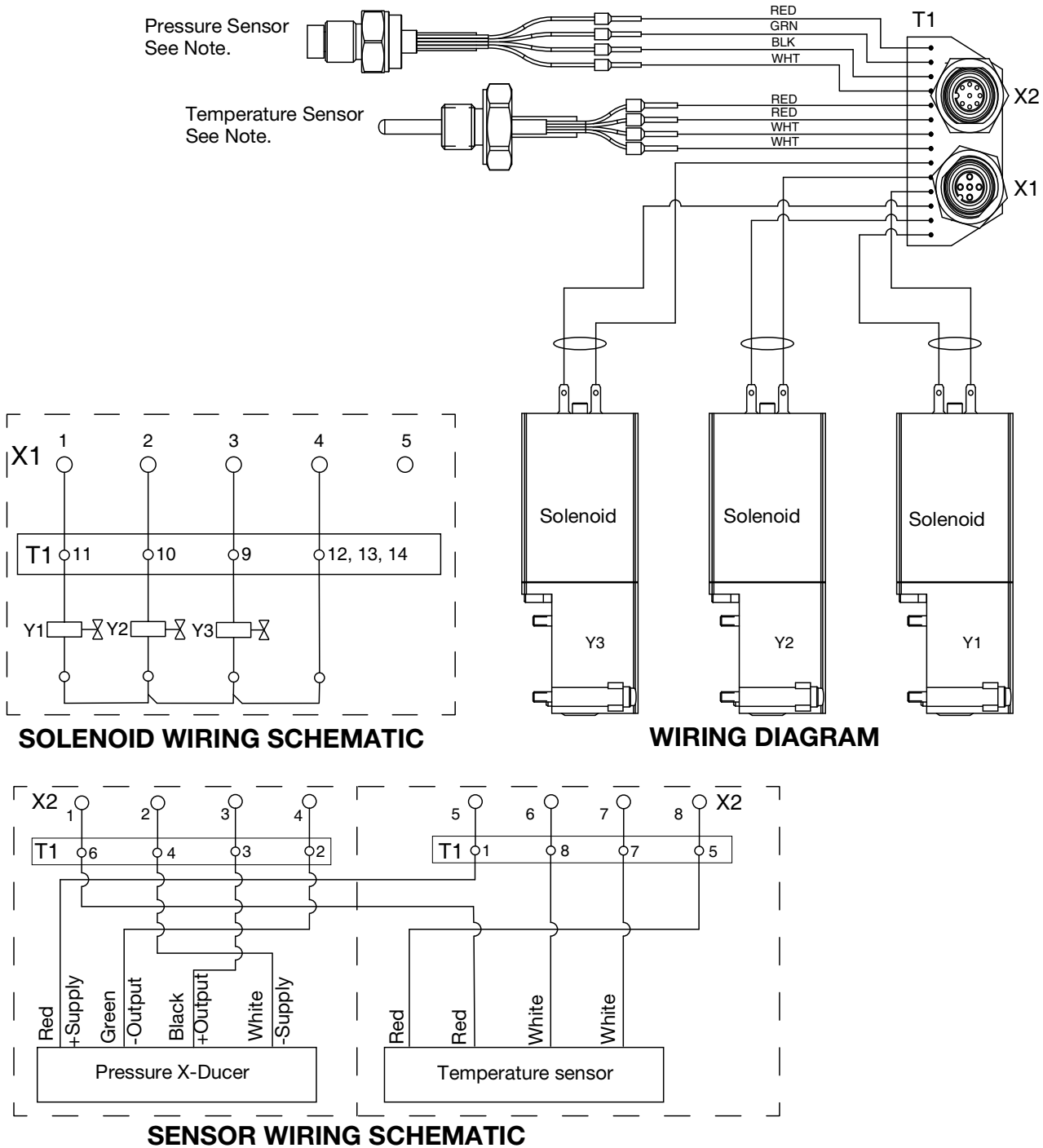


Fig. 54 Schematic for 25T992, 25T993, 25T995 and 25T996

**NOTES:**

1. For 25T993 and 25T996 use pressure transducer and temperature sensor.
2. For 25T992 and 25T995 use temperature sensor only.
3. See **Electrical Components** table page 51 for specifications.





# Technical Specifications

<b>SST Switch 3D Gun</b>		
	<b>US</b>	<b>Metric</b>
Maximum fluid working pressure	3350 psi	23.1 MPa, 231 bar
Maximum fluid temperature	176° F	80° C
Minimum air pressure	80 psi	0.55 MPa, 5.5 bar
Maximum air pressure	116 psi	0.8 MPa, 8bar
Length	Varies by nozzle type; maximum: 20.92 in. / 532 mm	
Swivel height	6 in.	150 mm
Mounting Arrangement	Robot mounting flange	
Air ports	0.3 in	8 mm
Solenoid valve type	Mono stable 3/2 port	
Voltage	24 VDC	
<b>Material Inlet</b>		
All Models	Male 1/2 in. BSPP connector	
<b>Torque Requirement</b>		
M 2.5, screw	8 in-lb	0.9 N•m
M 3, Screw	12 in-lb	1.35 N•m
M 4, Screw	33 in-lb	3.7 N•m
M 5, Screw	57 in-lb	6.4 N•m
M 6, Screw	80 in-lb	9 N•m
M 8, Screw	230 in-lb	26 N•m
1/2 in. BSPP, Nipple	15 ft-lbs	20.34 N•m
(901) NUT, retaining	15 ft-lbs	20.34 N•m
(101) NUT, turnbuckle, locking	75 ft-lbs	101.69 N•m
Sensors	100 in-lbs	11.3 N•m
<b>Shaft Rotational Load</b>		
All models	62-159.3 in-lb, 0 - 3350 psi	7-18 N•m 0 - 230 bar
<b>Nozzle Angles</b>		
25T991, 25T992, 25T993	0   45   75	
25T994, 25T995, 25T996	0   45   90	
<b>Weight</b>		
All Models	16.3 lbs (7.4 Kg.)	
<b>Wetted Parts</b>		
All Models	UHMW PE, Stainless Steel, Tungsten Carbide, Acetal, FKM, PTFE, Urethane	

## Electrical Components

Part Number	Description	Electrical Rating
17V829	Sensor, Temperature	100 ohm platinum rtd sensor
15N089	Transducer (350 bar, 5000 psi)	10/30 Vdc input, 0.5 to 4.5 Vdc output
17V890	Solenoid	24 Vdc: 2.88W

## California Proposition 65

### CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm – [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

# Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

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# Graco Information

## **Sealant and Adhesive Dispensing Equipment**

**For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).**

**For patent information, see [www.graco.com/patents](http://www.graco.com/patents).**

**TO PLACE AN ORDER,** contact your Graco distributor, go to [www.graco.com](http://www.graco.com), or call to identify the nearest distributor.

**If calling from the USA:** 1-800-746-1334

**If calling from outside the USA:** 0-1-330-966-3000

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Original instructions. This manual contains English. MM 3A8476

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